

THEOPHRASTEAN STUDIES

**ON NATURAL SCIENCE, PHYSICS AND
METAPHYSICS, ETHICS, RELIGION,
AND RHETORIC**

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Volume III

THEOPHRASTEAN STUDIES
//
**ON NATURAL SCIENCE, PHYSICS AND
METAPHYSICS, ETHICS, RELIGION,
AND RHETORIC**

Edited by
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and
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Preface

This is the third volume of *Rutgers University Studies in Classical Humanities*, a biennial series under the general direction of Professor William W. Fortenbaugh. Volume I appeared in 1983, and its subject is the ethical epitome of Arius Didymus, court philosopher to the Emperor Augustus. Volume II, which appeared in 1985, and the present volume are concerned with Theophrastus of Eresus. This reflects the fact that *Rutgers Studies* was founded in close connection with Project Theophrastus, an international undertaking whose goal is to collect, edit, and translate the fragments of Theophrastus, Aristotle's successor as second head of the Peripatetic school. Work on the project was begun in 1979, and since 1980 it has been most generously supported by the National Endowment for the Humanities. *Rutgers Studies* III has benefited from this support and indeed would not have been possible without it.

The majority of the papers in this volume were originally presented at a conference held at the Institute of Classical Studies in the University of London from the 25th to the 27th of June, 1985. The conference concentrated on two (overlapping) themes, Theophrastus' work in natural science and the Theophrastean opuscula that survive in manuscript form; and—reflecting the wide range of Theophrastus', like his master Aristotle's, interests—there were a number of papers on other topics too. The conference was organized by Dr. R. W. Sharples, lecturer in Greek and Latin at University College, London. In attendance were more than sixty scholars representing nine different countries. The participants and especially the conference organizer wish to express their gratitude to the Institute of Classical Studies for making its facilities available; to the Institute staff of Connaught Hall (University of London) and to Miss Frances Mills, secretary of the Department of Greek at University College London, for help in the preparation and running of the conference; and for financial support for the conference to the Institute of Classical Studies (Henry Brown Fund), the British Academy, the Society

for the Promotion of Hellenic Studies, University College London, and to Project Theophrastus itself.

One important communication to the conference is not represented here. This was a progress report by Dr. Hans Daiber concerning his work on the Arabic version of Theophrastus' *Meteorology*. Because of the importance of this work, it is hoped that it will soon be published as a separate volume in *Rutgers Studies*. Apart from this, the immediate concern of Project Theophrastus is the publication of a complete collection of the evidence for Theophrastus preserved in secondary citations from antiquity and the Middle Ages. Work on the text and translation volume is about three-quarters complete at the time of writing, and it will be followed by a series of commentary volumes. Anyone who wants to inquire, in the meantime, about the material collected is invited to contact Professor William Fortenbaugh, Project Theophrastus, Alexander Library, Rutgers University, New Brunswick, New Jersey 08903, USA.

W.W.F. R.W.S.

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PART I
PAPERS ON THE SCIENTIFIC
OPUSCULA

1

The Structure and Function of Theophrastus' Treatise *De odoribus*,

Georg Wöhrle

The short work *De odoribus* (*Od.*) by Theophrastus has received relatively little attention until now.¹ This could have something to do with the fact that it stands in the shadow of the other, more important works within the two editions presently available, the Fr. Wimmer edition,² still considered the standard edition but much in need of a replacement, and the Loeb edition, by A. F. Hort.³ In Wimmer's edition, *Od.* is fitted in between *De igne* and *De ventis* as Fragment IV; in the Hort edition, it, together with *De signis tempestatum*, is presented as a minor work, forming an appendix to his translation of *Historia plantarum* (*HP*). This positioning of *Od.* in both editions in itself shows that the actual meaning or function of *Od.* in the Theophrastic corpus has as yet not received an accurate evaluation. G. R. Thompson, in his regrettably unpublished dissertation from 1941 on the sixth Book of *De causis plantarum* (*CP*),⁴ put forward a theory with regard to the relationship of *Od.* to the author's other writings on plants, above all to *CP*. I would like briefly to summarize his theory here, because it seems to me hardly refutable and can also be supported by a few additional observations.

Eight books *Phytika aitia* and five books *Peri chulōn* are cited, among others, in the catalogue of Theophrastus' works compiled by Diogenes Laertios (5.46). Earlier, a book *Peri oinou kai elaion* and a work *Peri odēmōn* are mentioned (5.45). While Theophrastus discusses natural flavors and odors both in plants and in their parts in Book 6 of *CP*, he also indicates (6.7.6) that he later intends to discuss problems that have to do with changes in wine. In *CP* 6.11.2, he says that artificially and intentionally produced juices will be dealt with in a separate section. Both remarks lead the reader to the conclusion that *CP* may once have contained another Book, one that meanwhile has been lost; it may be possible to identify this book with the work *On Wine and Oil*

mentioned by Diogenes Laertios.⁵ If, as is probably the case, *CP* originally had a lost Book 7, which discussed juices produced by means of man's skill (since juices are discussed before odors in *CP* 6 also), then it is fairly certain that the fragrant products, such as ointments and perfumes, were dealt with in Book 8; *CP* 6.20 also refers to this subject. In this case, Book 8 of the *Phytika aitia* from Diogenes Laertios' catalog could be our work *Od.*, cited by Diogenes Laertios a second time separately as is also the case with the treatise *On Wine and Oil*. Thompson surmises further that the three books of the *CP* that deal with juices and odors produced naturally and artificially, together with the last book of *HP* (which originally consisted of two books) constituted the five books *peri chulôn* in Diogenes Laertios' catalog. This, however, need concern us no further here.⁶

What is important is that Thompson's results make it clear that *Od.* is no isolated treatise, standing apart from the rest of Theophrastus' writings on plants; rather, it constitutes an integral part of the original eight-book *CP*.⁷ This also leads us to conclude that *Od.* belongs to the category of aetiological works, that is, those writings in which the causes of certain phenomena are to be investigated. Theophrastus employs the same division as Aristotle, for instance in his zoological writings. In these, the different features (*differentiae*) that characterize the species or genera of animals are brought together in *Historia animalium*; then in *De partibus animalium*, *De generatione animalium*, and the *Parva naturalia*, the causes of these collected facts are investigated. Theophrastus' *HP* and *CP* are related to each other in the same way. *CP* deals principally with the underlying causes for the origin of plants and parts of plants.⁸ The last three books of *CP*, that is, *CP* 6, *On Wine and Oil*, and *Od.*, are devoted to the origin of natural and artificial flavors and odors. *Od.* is concerned specifically with the causes of the origin of artificial odors, together with the causes of certain characteristics and effects of these odors, as is formulated at the end of *CP* 6: "Matters relating to their mixtures [that is, of flavors and odors], their reactions to one another, and their potencies must now be discussed."

The expressions used here (in *Od.* as in the other aetiological works) to indicate these causes are numerous. For example, we find such formulations as *aitia*, *aition d'hoti*, or *dia* with the accusative or an infinitive construction. The cause is occasionally found in a causal clause beginning with *gar*. Especially significant are the problem-questions beginning with *dia ti*, a form often used in the pseudo-Aristotelian *Problemata*. From time to time (for instance, in *Od.* 37), Theophrastus makes use of several causes in explaining a phenomenon,⁹ as he does in other works (and in this he follows Aristotle).¹⁰

Little can be said about a final cause in these aetiological works, because it is precisely the causes of origin that are the main topic. Note, however, that

Theophrastus occasionally weaves in a teleologically orientated comment. An example of this can be found in *Od.* 9, where he states that the mixture of aromatic substances is carried out for the scent and for the sense of smell (*tēs osmēs heneka kai pros tautēn tēn aisthēsin*; compare *Od.* 7). I point this out because the lack of final causes in Theophrastus' writings on plants has led to the assumption now and again of a conscious criticism of Aristotle's teleology; in fact, this is quite out of the question.¹¹

Having thus defined the position of *Od.*, let us next undertake a rough survey of the work's structure and content. On the whole we can recognize a definite form, even if we may not use the same criteria in examining a classical work as we would when examining a modern scientific treatise. Difficulties are caused, above all, by the second half of the script, in which there appear to have been transpositions of paragraphs. The last two paragraphs do not belong at all to *Od.*: Paragraph 70 contains a comment about rocks in the Red Sea; paragraph 71 is completely incomprehensible.¹² It is true that the work has a noticeably smaller number of pages than the other books from the writings on plants (approximately thirteen pages in the Wimmer edition compared with an average of seventeen pages for *HP* and twenty-six pages for *CP*); however, it is not easy to infer from the point of view of content to what degree it represents a fragment.¹³

In the first six paragraphs, Theophrastus provides a general introduction to the theme of the treatise, mostly repeating the fundamental facts about the origin and forms of odors. In this, he could be referring directly or indirectly to *CP* 6, in which he has already discussed the most important aspects of this theory.

In paragraph 7, he announces the subject of the treatise: he wishes to discuss odors that are produced *kata technēn kai epinoian* as he has already done in the case of the *chuloi*.¹⁴ This section of the work runs until paragraph 13, and comprises a discussion of the basic possibilities for mixing dry and moist (liquid) substances for the production of synthetic odors. Also mentioned is the purpose of producing substances emitting odors (*Od.* 9): this is a matter first of the pleasant odor itself, and then of one's sense of taste—as in the case of the use of perfumes to scent wine—since the senses of taste and smell are closely related. Two *aporiai* close this section of the work.

The first sentence of paragraph 14 similarly provides the theme of what follows: in order to conserve each scent for as long as possible, oil is used as the base of perfumes (*mura*). The ensuing discussion, up to and including paragraph 20, concerns the use of different types and qualities of oil as bases for perfumes. The end of the last sentence of paragraph 20 states: "Such are the special characters (*phuseis*) and properties (*dunameis*) of the various oils."

In the following paragraphs, the subject is the ingredients of the perfumes,

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the *arōmata* (spices). In paragraphs 21–26, the fundamental characteristics of the *arōmata* are named, and their treatment and use in the production of *mura* are reviewed.

Paragraphs 27–31 indicate the different parts of plants that are used in the production of different perfumes. Formulas are given for a few of the important ones; dyes are also discussed.

In paragraphs 32–34, other characteristics of *arōmata* (in addition to the odors) are discussed, namely those that contribute to the flavor (*pros tas geuseis*); such characteristics are bitterness, or a burning or astringent effect. A conclusion to the subject is given in the first sentence of paragraph 35: “These examples may suffice for study of the characters and properties of spices.”

Following this, paragraphs 35 and 36 form a type of digression about the medicinal characteristics of certain perfumes, which are explained on the basis of their ingredients. This digression is noted as such at the end of paragraph 36: “However, these matters lie outside our subject of study (*exō tēs technēs*).”¹⁵

Krasis and *mixis* are the themes of paragraph 37 and the first half of paragraph 38. The same ingredients do not always give useful results. The quality of the season and of the time of the harvesting of the ingredients have an influence, as does the storage period after the harvest. This, too, is followed by a conclusion: “So much for the origin (*genesis*) and composition (*synthesis*) of perfumes.” Up to this point, the origin and composition of perfumes have been the subject of discussion. Now we proceed to the characteristics of perfumes: the second half of paragraph 38 and paragraph 39 deal with durability (*poluchroniotēs*), paragraphs 40 and 41 the loss of quality through exposure to heat, evaporation, and air, paragraphs 42ff. the potency of odors and further *dunameis*, special qualities (*idion* paragraph 52) mixtures of perfumes, etc. The entire section ends at paragraph 56 with the remark that enough has now been said about the production (*poiēsis*) and effects (*dunamis*) of perfumes. I believe that this statement refers to the entire section from paragraph 14–paragraph 56.

Next, Theophrastus turns to the *xērōn mixis*, the production of powders (*diapasmata kai suntheseis*). Since it is not the specific ingredients that are important here, but rather that as many different substances as possible are mixed, there is only a short discussion of this (paragraph 57–paragraph 58).

The remaining paragraphs offer particular difficulties, since without further evidence, it is not possible either to fit them into the context or to say that they unquestionably do not belong in the work. In paragraphs 59 and 60,¹⁶ the medicinal characteristics of perfumes are once again discussed (as in 35 and 36); the relationship to the rest of the work is shown by means of a reference back to 36.¹⁷ In paragraph 61, however, a completely new subject is introduced, one that is no longer directly related to the artificial production of odors. Paragraphs 61–63 discuss peculiarities concerning odors with regard to

animals, as well as some oddities concerning the odors of animal and vegetable products. Paragraphs 64–68 go into the question both of the definition of odors and of their physical nature, a comparison being drawn with the *chuloi*. Paragraph 69 appears to be a duplicate of paragraph 57, while the final paragraphs, 70 and 71, as has been noted before, do not relate to the rest in any way at all. Let us try to draw together the entire work in an outline:

De odoribus

	§§ 1–6 :	general introduction	
	§§ 7–13:	specialized introduction: Odors, which are artificially (<i>kata technēn</i>) and deliberately (<i>kai epinoian</i>) produced	
	§§ 14–20:	oils as a base for perfumes	
	§§ 21–26:	characteristics and use of <i>arōmata</i>	
cf. § 35 (init.)	§§ 27–31:	parts of plants and composition of certain perfumes.	cf. § 38
	§§ 32–34:	further characteristics of <i>arōmata</i>	
	§§ 35–36:	digression: Medicinal qualities of certain perfumes	
	§§ 37–38,		cf. § 56 (fin.)
	1st half:	<i>krasis de kai mixis</i>	
	§§ 38,		
	2nd half-		
	56:	characteristics of <i>mura</i>	
	§§ 57–58:	<i>diapasmata kai suntheseis</i>	
	§§ 59–60:	medicinal qualities of <i>mura</i> (supplement)	
	§§ 61–63:	characteristic smells of animals, curious facts about the smell of animal and vegetable products.	
	§§ 64–68:	definition and physical nature of odors	
	§ 69:	same as 57	
	§§ 70–71:	do not belong to <i>Od.</i>	

Let us now turn to specific areas of Theophrastus' theory for the production of synthetic odors. As I mentioned before, Theophrastus first of all repeats in the first six chapters some general characteristics of odors and their origins. In so doing, he can refer to previously acquired knowledge from *CP* 6; for the most part, however, he is also in agreement with the Aristotelian viewpoints as represented in *De anima* 421a7–422a7 and *De sensu* 422b27–445b2. Above all, he discusses the following points:

1. All odors originate from a mixture, as do all flavors, since the *haplā* as such are odorless.¹⁸
2. The individual odors lack special designations, in contrast to the different

- types of flavors. Many differences exist within the two groups of *eusma* and *kakosma*; you should note, however, that the designations of odors as pungent, strong, mild, sweet, and heavy can in part be used for both groups (these designations cannot therefore be used as specific differences).
3. Plants, animals, and inanimate objects have their own odors, of which we are partially unaware, because our sense of smell, compared to that of other living things, is very bad.¹⁹
 4. No animal seems to take pleasure from a pleasant scent for its own sake; instead, it is only the odor of things that concern its nourishment and its enjoyment which please it. This view, too, goes back to Aristotle, who distinguishes between two types of the smellable in *De sensu* 443b16ff.: one type is related to flavors and excites pleasure or displeasure only as a side effect (*kata symbebēkos*), because it is associated with nourishment. Other smells exist, however, that are pleasant or unpleasant in themselves (*kath' hautas*), because they do not lead to pleasure as nourishment. This second way of perceiving odors is, however, peculiar to mankind.²⁰
 5. Generally speaking, things that possess a pleasing odor have a bad, astringent, and very bitter taste; in *CP* 6.16, this opposition of taste and smell is explained by the differing results of cooking (*pepsis*), that is, the ripening process.²¹
 6. Good or bad odors are dependent on the *oikeia phusis* of the relevant plant or the relevant part of the plant; ripening occurs as a result of the warmth intrinsic in the plant itself. In inanimate bodies, odor and flavor originate and change as a result of the effective forces of the elements (*haplā*).

In paragraphs 7 and 8, Theophrastus presents his theory of the different possibilities for blending when producing synthetic odors. Note that Theophrastus' classification of natural and artificial processes and products is characteristic of his writings and can be found throughout his works concerning plants. This is especially noticeable in *CP*. It is stated at the very beginning of Book 2 that nature's influence on the sprouting of the plant and the formation of fruit is to be studied first of all, and then the influence of *technē* (this in *CP* 3 and 4). Book 5 deals with processes running against nature without the intervention of any *technē* on the one hand, and those technological influences that have as their aim specific, extraordinary results, on the other. The organisation of Books 6–8 has already been mentioned.²² All in all, Theophrastus appears particularly interested in the processes of technology. Thus it is that we find him turning his attention in his writings on plants towards technological processes in the fields of agriculture, in the finishing of wood, in the production of medicines, in cooking, in dyeing, and even in the production of cosmetics. Elsewhere (in *De lapidibus*), he turns to stone-working and the utilization of ore.²³

His theory of the production of odors thus looks like this: since odor is formed through mixture, and since there are basically two classes of mixable

matter, the liquid and the solid (dry), one can mix either similar with similar or different with different. The result of this is three possible combinations: liquid with liquid, solid with solid, and liquid with solid. In practice, Theophrastus writes, the following results: solid is mixed with solid in the production (*synthesis*) of *arōmata* and *diapasmata*. Liquid is mixed with liquid in the formation of *mura* and in enriching the flavor of wine. Most often, solid is mixed with liquid, namely in the *muron kai chrismatos synthesis*. A few difficulties may be found in the terminology of the different odors due to the fact that it is not completely exact. *Arōmata* refers both to the scented mixtures in general and to the separate ingredients of these mixtures. In *HP* 9.7.3, Theophrastus gives a general list of ingredients used for perfumes (*eis ta arōmata*): cassia, cinnamon, cardamom, spikenard, nairon, balsam of Mecca, aspalathos, storax, iris, narte, kostos, all heal, saffron-crocus, myrrh, kypeiron, gingergrass, sweet flag, sweet marjoram, lotos, and dill.²⁴ It is not completely clear whether *ta arōmata* in *Od.* 8 means the finished product made from dry scented material or whether *ta arōmata* stands simply for *sunthesis tōn arōmatōn*.²⁵ A passage in *Od.* 57 speaks in favor of the second interpretation: it is recorded there that the *xerōn mixis* is used for the production of *diapasmata* and *suntheseis* (cf. paragraph 69). Between *suntheseis* and *diapasmata* there seems to be only a gradual difference; Theophrastus says in paragraph 58, however, that the purpose of the *suntheseis* is to lend clothes a scent, whereas the *diapasmata* should be sprinkled over the bedcovers, so that they come into contact with the skin. There is no obvious difference between *muron* and *chrisma* here. *Chrisma* appears to be an ointment, used above all for personal hygiene²⁶ and may have differed in quality too from *muron*.²⁷

The procedures described by Theophrastus in the production of scented substances, together with further related questions, offer fewer problems with regard to detail, and have often been approached more from the technical angle; here, however, we will turn our attention once more to the problem of categorizing and naming the separate odors.

Theophrastus goes into this at the beginning of *Od.* as well as in paragraph 64 and 65. In paragraph 64, he criticizes Democritus, following here as often elsewhere the example of his teacher: while it is true that Democritus assigns the individual *chumoi* to the sense of taste, he does not assign odor and color to the underlying sensory perceptions in the same way. Yet he should have done this, in accordance with his doctrine of *schēmata*. Perhaps, continues Theophrastus, this is but a general problem,²⁸ since, in the case of odor, the *pathē* and *diaphorai* were not given names, in contrast to color and taste (this also applies in the sense of touch): differentiation is made only between *eusma* and *kakosma* (in paragraph 1, he speaks of a generic difference). Theophrastus had already critically examined Democritus' theory of an atomistic explanation for the different types of flavors in *CP* 6 and had rejected the theory. In *CP*

6.1.6, he lists Democritus' system of the different atomic forms assigned to their respective flavors. The atom producing a sweet effect, Democritus states, is round and large; that which produces a sour taste is large, rough, and many-cornered, etc. In *Od.*, Theophrastus obviously believes that since, according to Democritus, specific atomic forms produce specific types of flavor, it follows that he should indicate the atoms producing specific odors.²⁹ But Theophrastus finally concedes that everyone (including other scientists) has avoided an exact delimitation of odors.

Let us now examine the other passages, too, in which he comments on this problem. It is interesting that Theophrastus says in *CP* 6.4.1 that the forms (*ideai*) of flavor appear to be seven,³⁰ as is the case for odor and color. This indicates, first of all, that Theophrastus has a very definite list of the types of odor in mind; however, no such list is to be found in his existing works. It is possible that Theophrastus is thinking rather of a theoretical number of types of odor, which is derived from the similarity between smell and taste together with their origins. In *De sensibus* 90, he says, in connection with the theories of Plato, who had explained in the *Timaios* that the only clear difference between odors is whether they are pleasant or unpleasant (66d–67a):³¹ "One could be in doubt as to whether there are types (*eidē*) among the smellable substances (*peri tōn osmēton*), since they differ in their characteristics (*pathē*) and pleasant effects (*hēdonai*), as do the flavors (*chuloi*). At the same time, they (the odors and flavors) appear to behave in the same way in probably every instance."

Let us take another look at the passages already mentioned from Aristotle's *De an.* and *Sens.* In *De an.* 421a7ff., he explains that it is not so easy to identify something by means of odors and the sense of smell, because the character of odor is not as clear as that of sound and color. Unlike animals, human beings cannot differentiate accurately with this sense. The sense of smell seems to orientate itself for the most part to the sense of taste; the types of smells and senses of taste appear to be the same, and it is only that we taste much more precisely, because the sense of taste is a type of sense of touch with which man is able to differentiate very exactly. Aristotle, too, thus states explicitly that the types of taste and smell behave toward each other in an analogous manner (*eoike men gar analogon echein pros tēn geusin* 421a16ff.), and it is simply that the capability of man to differentiate between smells is weaker. Aristotle gives the reason for this analogical relationship between taste and smell in *Sens.* 443b3ff.: moist matter, both in the air and in water, picks up something from the flavored dry matter (*engchumos xērotēs*) and is influenced by it, that is, the smells behave as the flavors do, because the dry matter dissolves in the same way both in moisture and in (moist) air.³² Theophrastus followed this opinion exactly.³³ At the beginning of *CP* 6 (1.1), he defines taste and smell: "A flavored juice is a mixture of dry and earthy components in liquid, or it is produced when heat draws and filters the moist through the dry. . . . Odor, on the other hand, is produced by the dry component of the liquid flavor in that

which is transparent, which is a property of air as well as of water" (Thompson's translation).³⁴

We can therefore sum up that Aristotle and Theophrastus share the opinion that the difference between taste and smell exists above all in the different medium in which the dry ingredient is dissolved. From this, at least theoretically, the types of smell correspond to the types of taste. In the final analysis, therefore, labeling odors is a problem of terminology. Because of the limited human ability to grasp concepts,³⁵ we borrow names taken from the flavors. We describe smells, as Aristotle writes (*Sens.* 443b9ff.),³⁶ as pungent (*drimus*), sweet (*glukus*), sour (*austēros*), sharp (*struphnos*), and oily (*liparos*); you could place the rotten smell (*tas sapras*) alongside the bitter taste (*tois pikrois tas sapras an tis analogon eipoi*). Theophrastus points out in *Od.* 1, however, that it is not in every case that the odors carry the same designations as the tastes, as he has said before. He is referring here to *CP* 6.9.2, where he says that you could hardly speak of a bitter (*pikros*), salty (*halmuros*), oily (*liparos*), or sharp (*struphnos*) smell.³⁷ Here, Theophrastus appears to be contradicting Aristotle, who does speak of bitter, sharp, and oily smells. Perhaps Aristotle's assertion is meant to be theoretical, in order to give each taste a corresponding odor. On the other hand, the description of smells also remains subjective, due to the lack of definite terms. Theophrastus, too, expresses himself carefully in *CP*; 6.9.2 (*pikran gar odēmēn . . . ouk an ethelois legein*); the poet of the *Odyssey* also speaks of the bitter smell of the sea (*pikran . . . halos . . . odēmēn* 4,406).³⁸

Let us briefly summarize. In all probability, the treatise *Od.* can be identified with Book 8 of *CP*. This has been shown by G. R. Thompson, who based his theory above all on cross-references in *CP* and on Diogenes Laertios' catalog. Support for this theory is also found in the main theme of *Od.*, namely, in the focus upon causes of the origin of artificially produced odorous substances; this places *Od.* in the category of the *aetiological* writings.

It is true that *Od.* is preserved only as a fragment, as is made clear by the garbled end; but it does not appear that a great deal of the original text could have been lost, since the most important aspects in the production of odorous substances mentioned by Theophrastus in the introductory paragraphs are discussed in the existing text. Certain questions, for example the perfuming of wines, could have been discussed in the treatise *On Wine and Oil*, as well.

In his theories and opinions about the physical nature and the classification of different smells, Theophrastus is for the most part (with the possible exception of the question of terminology) in agreement with Aristotle.

NOTES

1. It has received some attention as a source of information for the production of ancient cosmetics; for instance in R. J. Forbes, *Studies in Ancient Technology*, vol. III, Leiden: Brill (1965) 30ff.

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2. *Theophrasti Eresii opera, quae supersunt, omnia* (Paris: Didot, 1866; reprint: Frankfurt: Minerva, 1964).
3. *Theophrastus, Enquiry into Plants, and Minor Works on Odours and Weather Signs* (London: Heinemann, 1916).
4. *Theophrastus on Plant Flavours and Odours. Studies on the Philosophical and Scientific Significance of De Causis Plantarum IV*, Princeton Diss. (1941).
5. Cf. note 113 of R. W. Sharples' paper in the present volume. He writes: "I am now convinced by CP 6.11.2 that *Peri oinou kai elaiou* was indeed the seventh book of an eight-book *De causis plantarum*."
6. In his article "Theophrastos" (*PW* Suppl. vol. 7, 1940), pp. 1354–1562, Otto Regenbogen had drawn conclusions similar to those of Thompspon. He arrives (1452) at an original order CP VI, *peri osmōn, peri oinou kai elaiou* (but cf. *ibid.* 1402, where Regenbogen quotes *Od.* 7, which refers to a previous handling of the artificially produced *chuloi*).
7. In a new edition of Theophrastus' writings on plants, the treatise *De odoribus* should be placed behind CP 6 for this very reason.
8. A work comparable to the treatise *PA* about the parts of plants does not exist. As I have shown elsewhere (*Theophrasts Methode in seinen botanischen Schriften = Studien zur antiken Philosophie*, 13, Amsterdam 1985, 8ff.), this is based on the fact that the knowledge of the function of parts of plants compared to that of parts of animals was much less extensive; also, that Aristotle and Theophrastus assigned a small role to the final cause in the plant system.
9. Cf. P. Steinmetz, *Die Physik des Theophrast von Eresos = Palingenesia* 1, Bad Homburg v.d.H.-Berlin-Zürich (1964) Index s.v. "Pluralismus der Ursachen".
10. Cf. Wöhrle (above, note 8) 145 ff.
11. Cf. G. Wöhrle, "Die Teleologie in den botanischen Schriften des Theophrast: Abkehr von Aristoteles?" *WüJbb.* 10 (1984) 47–55.
12. About the two sections 70 and 71 of *Od.*, R. W. Sharples writes to me: "I agree that they have nothing to do with the *De odoribus*; but I think that one can perhaps do a bit more with them. Section 70 refers not just to rocks but to fish inside them, and it could be connected either with material on stones and fossils or with the rather badly named *On fish that remain on dry land*. Section 71, I am pretty sure, relates to *On Metals*, although I agree its interpretation is obscure."
13. Cf. Thompson (above, note 4) 9.
14. This passage is misunderstood by Wimmer and Hort: "Next we must endeavor to speak of those odors, and also those tastes, which are artificially and deliberately produced" (Hort). Certainly more correct is the translation by Thompson (*ibid.* 19): "Theophrastus says that he must try to discuss odors that are produced by art and intelligence, just as he did with flavored juices."
15. Regenbogen (above, note 6) supposes that it is possible that paragraphs 32 to 36 have been shifted and belong before paragraph 21. It is indeed true that the reference in paragraph 21: *kathaper kai en tois proteron eipomen*, fits paragraph 32.
16. Originally paragraphs 61 and 62. Shifted by Wimmer (following Furlanus), and rightly so.
17. *Epei ge koilian kinei kai hē iris hōsper elechthē* referring to paragraph 36: *alla kai koilias lutikē*, and so on.
18. On this point, I see no conscious opposition to Aristotelian thought, as Thompson does (above, note 4). Indeed, Aristotle does write in *De sensu* 443a9ff. that the elements (*stoicheiai*)—fire, air, water, earth—are odorless, whereas Theophrastus explicitly names only the first three in *Od.* 1 and CP 6.3.1. He does not, however,

say that earth always has an odor, rather, he states: *malista odēmē echei* (Od. 1), and at the end of CP 6.3.1 he writes *gē de kai lithos achuma plēn ean tina toiautēn labēi mixin*.

19. Cf. Arist. *De anima* 421a7ff; CP 6.5.2; 6.17.10.
20. Cf. Ingemar Düring, *Aristoteles. Darstellung und Interpretation seines Denkens* (Heidelberg, 1966) 564.
21. Cf. Thompson (above, note 4) 56f.
22. Theophrastus treats this double aspect of the science of plants theoretically in CP 3.1.1. Cf. Wöhrle (above, note 8) 46.
23. Cf. Jerzy Schnayder, "Technologisches in den Werken des Theophrastos," *Eos* 52 (1962) 259–86.
24. Cf. 9.7.2.
25. Cf. Io. Gottlob Schneider, *Theophrasti Eresii, quae supersunt opera*, Bd. 4 (Leipzig, 1818) 646.
26. Xen. *Anab.* 4.4.13 mentions different types of *chrīma* (also pork fat) that are used instead of olive oil for massaging the body; (here also, it is distinguished from *muron*).
27. Cf. Schneider, *ibid.*
28. Cf. also Saara Lilja, *The Treatment of Odours in the Poetry of Antiquity* = *Commentationes Humanarum Litterarum* 49 (Helsinki 1972). On page 11ff. the author tackles the question of who the other researchers named by Theophrastus could be, who like Democritus did not differentiate especially between the odors.
29. As Theophrastus explains in *De sens.* 82, Democritus voiced little opinion either way as to the odors. Cf. also the Epicurean theory, *Ep. ad Hdt.* paragraph 53 and Lucretius 2, 414–17; 4,673ff. More complicated is Democritus' theory of colors, which is criticized by Theophrastus too; on this score Cf. *De sens.* 79ff.
30. For Theophrastus' uncertainty as to the number of *chumoi* between the possibility of 7 or 8, Cf. Thompson (above, note 4) 39f.
31. Cf. Theophrastus *De sens.* 85.
32. Cf. 442b27ff.
33. Cf. R. W. Sharples, "Theophrastus on Tastes and Smells" in *Theophrastus of Eresus, Rutgers University Studies in Classical Humanities*, Vol. II: (1985) 193ff.
34. Cf. Arist. *Sens.* 442b29f.
35. Cf. also CP 6.5.2.
36. Cf. also *De an.* 421a26ff.
37. Cf. also CP 6.14.12; cf. Galen XI 696ff. (Kuehn).
38. Cf. Alciphron, 3,59. As to modern theories on the types of odors, cf. Lilja (above, note 28) 13ff.

2

Identification of Titles of Botanical Works of Theophrastus

Michael G. Sollenberger

The place of the *De odoribus* among Theophrastus' botanical works and the identification of this *opusculum* with *Causae plantarum* Book 8 are two issues discussed briefly by Dr. Wöhrle in the first part of his paper in this volume. Since the topic is of some interest and a more detailed review of the evidence may prove useful, I want to offer here some supplementary comments concerning the relationship between the extant botanical works of Theophrastus and those listed in Diogenes Laertius' catalog of Theophrastus' writings (5.42–50). I will also present further evidence that will help to identify the “lost” books of Theophrastus' botanical writings.¹

As Dr. Wöhrle points out, there is a host of references, both forward and backward, as well as cross-references, in Theophrastus' existing botanical works that help to identify the supposedly lost books of the *Historia plantarum* (HP) and the *Causae plantarum* (CP). These references allow us to draw some conclusions about the contents of other botanical works of Theophrastus listed by Diogenes and to see one aspect of the consistent interrelatedness of Theophrastus' botanical writings as a whole. In addition, by reviewing the evidence, we can gain some limited but valuable insight into the nature of Diogenes' often perplexing catalog of Theophrastus' writings.

Among the 224 titles of works credited to Theophrastus by Diogenes Laertius occur the following seven:

1. *On Honey*, 1 book (*Peri melitos a'*), 5.44
2. *On Smells*, 1 book (*Peri odmon a'*), 5.45
3. *On Wine and Olive Oil* (*Peri oinou kai elaion*), 5.45
4. *Investigations Concerning Plants*, 10 books (*Peri phutikon historiôn a' - i'*), 5.46

5. *Explanations of Plants*, 8 books (*Phutikōn aitiōn a' - e'*), 5.46
6. *On Juices*, 5 books (*Peri chulōn a' - e'*), 5.46.
7. *On Fruits* (*Peri karpōn*), 5.50

These seven are the only titles in the catalog that can be assigned with certainty to Theophrastus' botanical writings.² A fragment of the first work is preserved by Photius,³ while the second, fourth, and fifth titles are respectively those of the extant *De odoribus*, *Historia plantarum*, and the *Causae plantarum*. Of the other three (numbers 3, 6, and 7), no identified fragments survive. However, if we examine Theophrastus' extant botanical writings themselves and mention of Theophrastus' discussion of botanical matters by other ancient writers, we acquire some good indications of what the other, supposedly lost treatises of Theophrastus contained as well as how and where they fit into his botanical corpus of writings.

Starting with the *HP*, first there is the problem of book numbers. Diogenes lists the *HP* as having ten books, whereas the extant work has only nine books. This difficulty has been resolved in at least two ways: First, Regenbogen⁴ tried to show that there were two different editions of the *HP* and that in the earlier edition Book 2 may have been two separate books: 2a consisted of 2.1-4 and 2b consisted of 2.5-8.⁵ Not only does such a division of Book 2 help to solve the difference between Diogenes' total number of books and the modern total, but it also helps to explain why some ancient references to individual books of the *HP* cannot be located in the like-numbered books of modern editions.⁶ A second explanation of the discrepancy, but one that does not help to explain ancient references to individual books, is that in the oldest and most authoritative manuscript of the *HP*, cod. Vaticanus Urbinas Gr. 61(U), there are indeed ten books.⁷ However, Book 10 merely repeats with some differences the contents of the second part of Book 9.⁸ Because of this duplication, Schneider, Wimmer, and Hort printed only nine books in their editions of the *HP*.⁹ All three of them, however, did incorporate readings from Book 10 into Book 9, whenever better readings were offered.

There is a third possible solution to the problem of total book number correspondence. In both the Paris manuscript containing excerpts from the *HP* (cod. Paris, Gr. 1823) and in the Aldine edition of the *HP*, the *editio princeps* of the work, Book 9 bears the inscription "On Saps of Plants or On the Power of Roots" (*Peri phutōn opōn ē Peri rhizōn dunameōs*).¹⁰ In reading Book 9 one sees that it is easily divisible into two distinct parts that may originally have been separate books.¹¹ The first part, chapters 1-7, contains a description of plant saps, juices, gums and resins, the manners of collecting them, and the distribution of plants that have them; the title "On Saps of Plants" seems quite appropriate. The second part, consisting of chapters 8-20, treats of the different sorts of medicinal plants and their preparations, power

and uses of their saps, and especially their collection and extraction from roots; “On the Power of Roots” seems a fitting title for this part. Further, chapter 8 signals a definite break with what precedes, for it begins with a general, programmatic statement:

Concerning the saps which have not been spoken of earlier, I mean, for example, if there are any which are medicinal or have other powers, we must try to speak (of these) in a similar manner, and at the same time (we must speak) of roots, for also some of the saps come from them.

HP 9 appears to be readily separable into two distinct parts and may well represent the original Books 9 and 10 merged together into one.

In regard to plant juices, in *HP* 1.2.1 Theophrastus maintains that sap (*hugron* or *opos*) is one of the four *archai* of all plant structures, the others being fiber, flesh, and veins. He proceeds to explain that the differences in it that are perceived by variations in taste and smell constitute essential characteristics of different plants (1.2.3; cf. 1.12.1–2). Consequently, we expect him to devote some part of his work to a description of these basic elements, the plant juices. In fact, he devoted two books to this topic—*HP* 9 and 10, which are now, as I have suggested, combined into one book, *HP* 9. Likewise, because the *CP* generally explains the aetiology and physiology and accounts for the common or distinctive characters of plants and plant structures described and identified in the *HP*, we would also expect the *CP* to contain some discussion of the causes and development of plant juices. This is just what we *do* get in *CP* 6. Looking back at the end of *HP* 1.12.1, we see that this discussion was foretold. After enumerating the differences in taste, shape, form, and smell of plants, Theophrastus writes:

On all these matters we must speak more precisely in the (books or writings) on juices (*en tois peri chulōn*), enumerating the different kinds themselves and what the differences are between them and what is the natural character and power of each.

This passage looks forward to the first part of *HP* 9 (chapters 1–7), where different kinds of juices are in fact enumerated, to part two of *HP* 9 (chapters 8–20), in which the powers of plant juices are dealt with, and to *CP* 6, which contains a detailed discussion of the natures and differences of these plant juices.

We find another forecast of the future discussion of the causes not only of juices, but also of smells of plants.¹² In *HP* 1.12.4 Theophrastus tells us that fragrance is found in various parts of plants and that juices are likewise distributed in various parts. He gives only a single example: the lime tree (*philura*), which has fruit no animal eats, but whose leaves are sweet and are eaten by many animals.¹³ Theophrastus concludes: “But also concerning this

and other such matters we must try to consider the causes later.” And, indeed, in *CP* 6.12.7, we discover that he does state the cause of the distribution of flavor in the fruit and leaves of the lime tree. Moreover, all of *CP* 6.11–15 is concerned with the causes of flavor and odor distribution and variation in the parts of plants.

There is yet one more passage that anticipates the contents of *CP* 6. In *CP* 2.16.1, discussing changes in odor, Theophrastus mentions the effects of climate and soil on plant smells. He winds up: “But these things concerning smells and juices must be considered by themselves at greater length in the later (books or writings).” If we go to *CP* 6.16–18, we see that these chapters deal precisely with this very topic—the effects of climate and soil on juices and smells of plants.

Passages in *CP* 6 also give clear indications of the contents of succeeding books.¹⁴ *CP* 6.3.3 includes a significant distinction:

Flavors (*chumoi*) occur in three things: in plants and animals there are certain odors and flavors corresponding to their blendings (*kraseis*), and moreover in things that are mixed by some art, or in things that alter spontaneously, sometimes for the better, sometimes for the worse, as in decomposition.

In regard to the latter, he probably had wine in mind, for he later discusses it briefly (6.7.5–6). What is important to notice here is that Theophrastus explicitly distinguishes *natural* from *artificial* flavors. He then singles out natural flavors for immediate discussion:

To speak of all of these things would be too broad and rather general. But first the natural flavors must be discussed, for nature is primary (or the starting-point) in all things, and of these, all that appear in simple bodies and in inanimate things in general and all that appear in plants and fruits. For one also places these (i.e., plants and fruits) prior to animals, but meanwhile our investigation is concerning them, being continuous, as it were, with the things which came before. (*CP* 6.3.3 end)

Together with this passage we should look at the end of Book 6 of *CP*:

Concerning odors, then, and flavors that are in plants, one must take consideration from these things (which have been said). But all things concerning their mixtures and their effects on one another and their powers must be treated by themselves. (*CP* 6.20.4)

This statement looks forward to a treatment of flavors and odors of plants that are mixed by art, their effects and powers, that is of artificial flavors and odors.

CP 6 is where we find the discussion of natural flavors (chapters 3–13) and natural odors (chapters 14–20) of plants. There is no extended treatment of plant flavors produced by art in the *CP* outside of the brief statements in

chapter 7 as mentioned earlier, where the changes that occur in wine are related to alterations that occur in the decomposition of natural juices (6.7.6). Theophrastus ends this section with, "But it is more suitable to enter upon such matters in the following (books or writings)." However, such a discussion of wine occurs nowhere in the extant *CP*. It seems reasonable to assume that wine and other artificial juices were the topics of one of the two lost books of the *CP*. The validity of this assumption is further supported by what Theophrastus says in *CP* 6.11.2. In mentioning natural juices obtained from fruit, for example from grapes, olives and figs, he states the following:

They also make some of the juices depart from their natures by inducing decomposition and turn them into drinkable juices, for example, those who make wines from barley and wheat and the so-called *zuthos* in Egypt. The starting-points and power of all of these are natural, but the resulting products are rather from art and intelligence. But these things concerning the products of intention and art must, on the one hand, be considered by themselves, while on the other, the characters (*ta pathē*) and origins of the natural juices are to be considered from what has been said.

These characters were discussed in *CP* 6.9.1–11.2 and the origins in 6.3.4–8.8.

Since Theophrastus discusses *naturally* flavored juices before odors in *CP* 6, perhaps we can assume that in treating *artificially* prepared flavors and odors he likewise dealt with flavors first. If so, it is likely that *CP* 7 concerned artificially flavored liquids, and wines and oils in particular. If this is correct, then perhaps the title under which *CP* 7 was known was *On Wine and Olive Oil*. This title is listed separately by Diogenes Laertius (5.45), and the work may have circulated in separation from the larger work of which it was a part.¹⁵ Accordingly, we may assume that *CP* 8 treated different fragrant preparations from plants—perfumes, ointments, powders, incense and the like. This is the major topic of the extant *De odoribus*, which, as a result, will be the remainder of the lost Book 8 of the *CP*.¹⁶

Back references in the *De odoribus* to treatments of artificial flavors in previous books clearly indicate that this was actually the order of treatment, that is, artificial flavors before odors.¹⁷ In *De odoribus* 2, Theophrastus says, "The characters (of odors) seem to correspond to those of the flavors, but they do not all have the same names, just as we said in former (books or writings)." He had commented on this very dissimilarity between the names of flavors and orders in *CP* 6.9.2. Then, in *De odoribus* 7, Theophrastus announces that he "must try to speak of those (odors) that are produced artificially and deliberately, just as (I did) concerning juices." I assume that this back reference to a discussion of juices produced artificially is to the preceding book, *CP* 7, which was also known separately under the title *On Wine and Olive Oil*.

The distinction made by Theophrastus between natural and artificial flavors

and odors of plants and their parts seems to have been handled by him in separate books: *CP* 6 contains the discussion of natural flavors and odors, while *CP* 7 concerned artificial flavors and *CP* 8 artificial odors. This reconstruction of the supposedly lost final two books of the *CP* exonerates Diogenes Laertius of any error in the recording of eight books for the work and establishes the extant *De odoribus* well within the Theophrastean botanical corpus as *CP* 8. All definite traces of *CP* 7, *On Wine and Olive Oil*, however, seem to have vanished.¹⁸

From this reconstruction other identifications of botanical titles listed by Diogenes Laertius may be suggested. The last three books of the *CP* (6–8) all concern plant juices—*chuloi*. When we recall that *HP* 9 also treats various plant juices and that it is likely that the ninth book was originally two books, we arrive at a total of five books on plant juices. These five may well correspond to Diogenes' listing of a five-volume work *On Juices* (*Peri chulôn a' – e'*, 5.46 end).

It is remarkable that the final books of the *HP* and *CP* should be cataloged two different times by Diogenes: once as parts of the large collective works and then as parts of a smaller collective work with a more specific title, *On Juices*. Moreover, *CP* 7 and 8 are each catalogued a third time as individual, single-volume treatises: *On Wine and Olive Oil* (*CP* 7), and *On Odors* (*CP* 8). This should not be surprising, for there are, to be sure, other examples in Diogenes' catalog of separate listings of parts of collective works under more specific titles as well as many repetitions and reduplications of titles: the multiple listings of the parts of the *HP* and *CP* are not at all unique.¹⁹ Without going into great detail, let me give two examples of similar cases.

First, Diogenes lists seven individual works, each in one book, relating to animals in 5.43–4.²⁰ These seven are followed immediately in the list by a collective work entitled *On Animals*, in seven books (5.44). Scholars have made the attractive suggestion, now generally accepted, that the collective work in seven books comprised all seven preceding single-volume works.²¹ Each of these zoological works was a monograph under a separate title that stood on its own as a separate work and also was part of a larger, collective treatise.

Second, in 5.46, Diogenes records a work entitled *On Physics*, in eighteen books, and another eight-volume treatise entitled *Physics*. Steinmetz has argued for the identification of the eight-volume work with the first eight books of the eighteen-volume work.²² While this is certainly arbitrary and his reconstruction of the remaining ten books remains open to doubt,²³ the basic premise that parts of works are often found listed under separate titles is not misguided. This becomes apparent when one observes that Themistius²⁴ cites Theophrastus "in the fifth book of the *Physics*, the second book of *On the Soul*." Diogenes not only lists the *Physics* as one work in eight books (5.46), but also

the separate work *On the Soul* (5.46).²⁵ Themistius' reference shows that Books 4 and 5 of *Physics* were also known and perhaps circulated separately under a different title, *On the Soul*. Elsewhere, Simplicius²⁶ tells us that Theophrastus' *On Heaven* was the title of Book 3 of his *Physics*. *On Heaven* is also listed separately in one book by Diogenes (5.50). Still further, we can gather from the several references to the first three books of *Physics* that they concerned motion and are most likely listed separately by Diogenes as *On Motion*.²⁷ This indicates that Book 3 of Theophrastus' eight-volume work *Physics* was also Book 3 of his *On Motion*, was also known under the separate title *On Heaven*, and was perhaps included as Book 3 in the large, collective work *On Physics*, in eighteen volumes. Diogenes lists each of these titles separately and without discrimination, for no reference is made to the identification of smaller works as parts of larger ones.

I could review other examples of separate listings of parts of collective works in Diogenes' catalog as well as different titles for the same work and other sorts of duplication, but it should be obvious that multiple listings of the botanical writings of Theophrastus, now as large collective works, now as smaller collective works on a more specific topic, and as individual monographs, are not at all uncommon in Diogenes' catalog.

Two botanical titles in Diogenes' list remain to be considered here. From the first, *On Honey*, a very short excerpt has been preserved by Photius, as I mentioned earlier.²⁸ The excerpt is tantalizingly brief, and little can actually be concluded from it except that the work was related to botany and thus fit somewhere into Theophrastus' botanical corpus of writings. We can point to passages in the *HP*, the *CP*, and *De odoribus* where honey is discussed, but none of the information corresponds very closely with the material from Photius. It does not look like *On Honey* is an alternate title for a part or parts of the larger works. Moreover, some details concerning honey, its character, varieties, production, etc., are given by Pliny, *NH* 11.30–45, and some of these match up with items in Photius' excerpt, which leads me to the conclusion that Pliny used Theophrastus' *On Honey* as one of his sources. Further, the pseudo-Aristotelian *De mir. ausc.* 16–22 831b18–832a13 contains information on honey that may have been excerpted from Theophrastus' work. In particular, chapters 17 and 22 of *De mir. ausc.* mention honey in connection with oil and wine, which suggests a possible relationship of *On Honey* with *On Wine and Olive Oil*.²⁹ But I cannot draw more than these few conclusions with confidence.

Concerning the final botanical work listed by Diogenes, *On Fruits*, almost nothing can be said with certainty. One might guess that it, like others, is a separate title for one or more portions of the larger collective works (such as *HP* or *CP*). Einarson, in an appendix to *CP* 6, suggests that *On Fruits* is another version or another name for *CP* 5. But this does not seem at all likely,

since *CP* 5 begins with the spontaneous and unnatural occurrences and alterations in plants (chapters 1–4) and proceeds to the unusual effects produced in some plants by artificial means (chapters 5–7), while the remainder of the book (chapters 8–18) is devoted to the diseases, decompositions, and deaths of plants and their parts. Fruits are indeed considered in *CP* 5, but by no means can they be said to be the main topic. Nor can it be said that fruits are only discussed in *CP* 5, for they crop up in practically every book of both the *HP* and *CP*.

Theophrastus' definition of fruit is broader than ours. In *HP* 1.2.1 he explains: "Fruit is the complex of seeds along with the seed vessel" (*karpos d'esti to sugkeimenon sperma meta tou perikarpiou*). But then in *CP* 1.19.1 he modifies that definition by distinguishing the pericarp, the seed vessel, or what surrounds the fruit, from the fruit proper. It appears from different passages that he considers fruit sometimes as the pulp alone, sometimes only as the seed vessel, sometimes as the seeds by themselves, and at other times, as the three together.³⁰ Moreover, we learn from *CP* 1.16.3–6 and 1.21.1–2 that the end or goal of a tree's nature is to produce fruit that will ripen and to reproduce (from seed).³¹ Given the importance of fruit, it surely deserves some extended description and analysis in any comprehensive botanical work, but outside of the brief discussion of fruit aetiology in *CP* 1.14.1–1.21.3, there is no extensive or large-scale treatment of fruit in either the *HP* or the *CP*. Diogenes' listing of a book *On Fruit* does not seem to be a separate title for a portion or portions of the surviving botanical treatises. It appears then that *On Fruits* was an independent monograph, related to, but not part of, the collective works, and has simply disappeared.

NOTES

1. I have been guided in these comments not only by Dr. Wöhrle's paper and personal remarks, but also by Dr. Robert Sharples' valuable article, "Theophrastus on Tastes and Smells," *Rutgers University Studies in Classical Humanities* 2 (1985) 183–204, and by personal communications with him. Further, I should mention that G. R. Thompson's *Theophrastus On Plant Flavors and Odors: Studies in the Philosophical and Scientific Significance of De Causis Plantarum VI, Accompanied by a Translation and Notes* (Diss. Princeton, 1941) and access to copies of typescripts of B. Einarson's as yet unpublished Loeb edition of *CP* 6 afforded me by Prof. William Fortenbaugh, have been of immeasurable assistance to me.
2. There are, of course, other works listed by Diogenes which may have included botanical matters, e.g., *Collection of Problems*, 5 books (5.45; repeated, but in only one book in 5.48), *Political, Physical, Erotic, Ethical Problems*, 1 book (5.47), *On Physical Problems*, 1 book (5.48; repeated in 5.49), *Aristotelian or Theophrastean Commentaries*, 6 books (5.48), *On Causes*, 1 book (5.49), *On Generation*, 1 book (5.49), et al., but for none of these works do we have any positive evidence of discussion of botanical matters.

3. Photius, *Bibliotheca* cod. 278, 539b11 ff. (vol. 8 p. 169.25 ff. Henry) is Theophrastus, fr. 190 Wimmer.
4. O. Regenbogen, "Theophrast-Studien I: Zur Analyse der *Historia Plantarum*", *Hermes* 69 (1934) 75–105 and 190–203, esp. 201–3, and later in his article "Theophrastos", no. 3, in Pauly-Wissowa's *RE* Supp. 7 (1940) 1439.
5. J. G. Schneider, *Theophrasti Eresii Quae Supersunt Omnia et Excerpta Librorum*, vol. 5 (Leipzig, 1821) 233–4, reports and seems to endorse the view of Hahnemann, *De Helleborismo*, p. 10, that the present Book 4 was originally two books (i.e., 4 is 4.1–12 and 5 is 4.13–16). On the various problems presented by the contents of Book 4, see Regenbogen 1445–7 and 1466–7.
6. It seems clear that there was an early edition or recension of the *HP* which had only eight books. Apollonius, *Hist. mir.* 50, refers to material in 9.17.3 (his eighth book) as appearing in the last book of the treatise. Regenbogen was wrong to exclude Books 4 and 5 from the early *HP*, as is shown by J. Keaney, "The Early Tradition of Theophrastus' *Historia Plantarum*", *Hermes* 96 (1968) 295. Keaney observes that Apollonius, *Hist. mir.* 32, while not citing a specific book, has information taken from *HP* 4.4.9. Also, Harpocration, *Lex.*, s.v. *oloschoinō*, specifically cites *HP* 4 (*en tōi d' Peri phutōn*) for material taken from *HP* 4.12.1. Obviously Book 4, at any rate, was included in the edition used by these two. Moreover, many ancient references can be identified in modern editions of the *HP*, but sometimes in the book preceding the one cited; e.g., Apollonius, *Hist. mir.* 33, cites Book 7 for material found in 8.4.5; in 41, he refers to Book 8 for information in 9.18.2; Harpocration, *Lex.*, s.v. *melinē*, says *en tōi z' (7) Peri phutōn* of a passage found in 8.1.1; Galen, *De fac. alim.* 1.13.11 (*CMG* vol. 5.4.2 p. 237.20–4 Helmreich) quotes *HP* 7 for information now in 8.9.2. For further discussion of the problems of correspondence between ancient and modern editions of the *HP*, see Keaney's article.
7. Ten books are also reported in cod. Laur. 85.3 (M), cod. Laur. 85.22 (N), cod. Marc. Gr. 274, cod. Vat. Pal. Gr. 162, and in volume four of the Aldine edition of Aristotle's works printed in Venice in 1497–98. See Schneider, vol. 2 p. 200, vol. 3 p. 841–43 and vol. 5 p. iii, 70–8 and 233, F. Wimmer, *Theophrasti Eresii Opera Quae Supersunt Omnia*, vol. 1 (Leipzig, 1854) p. xxvi and xxx, reiterated in his next (third) edition (Paris, 1866) p.x., A. F. Hort, *Theophrastus, Enquiry into Plants* vol. 2 (Loeb, 1926; rpt. 1977) 252 n.1 and 321 n.2, Regenbogen 1435–6.
8. In U, Book 10 first repeats 9.20.6 and then, with variations, 9.8.1–9.19.4. M, N, Marc. 274 and Vat. Pal. 162 likewise have introductions to Book 10 drawn from 9.20.6, but only continue with 9.8.1–9.10.3 before leaving off. The Aldine edition has only a few sentences taken from Book 9.
9. Hort, vol. 2 p. 321 n.1, reports that the Latin translation of the *HP* by Theodore of Gaza (Tarvisium, 1483) and the edition of D. Heinsius (Leyden, 1613) did feature ten books. Also, Schneider, vol. 1 p. xxv, records that the 1813 Oxford edition by J. Stackhouse likewise had ten books.
10. See Wimmer (1854) vol. 1 p. xxv and (1866) p.x., Keaney 298 n.1 and H. Joachim, *De Theophrasti Libris PERI ZOÏON* (Diss. Bonn, 1892) 1 n.3.
11. This is, of course, the same method as that employed by Regenbogen and Hahnemann for arriving at a total of nine books. Although this does not resolve the discrepancies in ancient references to individual books, I am convinced that Book 9 is more readily divisible into two parts than either Book 2 (Regenbogen) or Book 4 (Hahnemann). See also Thompson 11, and O. Kirchner, *De Theophrasti Eresii Libris Phytologicis* (Diss. Breslau, 1874) 42.

12. On the close relation between the sense of taste and smell and accordingly the respective objects of these senses (i.e., flavors and odors) see G. M. Stratton, *Theophrastus and the Greek Physiological Psychology Before Aristotle* (New York, 1917) 43–5, and Sharples (1985, cited in note 1 above).
13. The inedible fruit of the lime tree is again mentioned in *HP* 3.4.6, perhaps as a gloss. The male and female varieties of the lime tree are described and distinguished according to parts in *HP* 3.10.4–5. The sweetness of the lime tree's leaves is said to be due in part to the fact that honey falls on them from the air, according to Photius' excerpt from Theophrastus' *On Honey* (*Bibl.* col. 278, 529b18–24; see note 3 above).
14. Only six books of the *CP* have survived from antiquity. Diogenes, however, lists it as having eight books. Unlike the *HP*, there are no differences in ancient citations which suggest that the *CP* was subject to different divisions, i.e., sometimes into eight books, other times into six. Rather, it will be argued, the identities of the two "lost" books are known, are listed under separate titles by Diogenes, and one of these books is in fact extant, but known under its special monographic title.
15. Diogenes lists no book numbers for *On Wine and Olive Oil* and it is assumed that the work contained only one book, the *a'* having simply fallen out of the manuscripts.
16. Dr. Wöhrle reaches the same conclusion about the identity of *CP* 7–8 in the first part of his paper. See also G. R. Thompson 18–20, Sharples (1985) 184 and Regenbogen 1452.
17. Regenbogen 1452 does identify the last two books as *On Odors* and *On Wine and Olive Oil*, but reverses their order, suggesting that the former was *CP* 7 and the latter *CP* 8.
18. While there are no explicit references to *On Wine and Olive Oil* outside of Diogenes' listing of the title, Dr. Sharples has pointed out to me that Galen (*Simpl. med.* 2.5, 2.17, 4.3, 4.11 and 4.14) and Plutarch (*Quaest. conv.* 5.3 676A–B) both mention wine and olive oil as discussed by Theophrastus and that perhaps they were referring to this book.
19. It may be mentioned here that the monographic character of the individual books of both the *HP* and the *CP* has long been recognized.
20. 5.43, *On Difference of Voice of Animals of the Same Genus*, 1 book, *On (Animals) Appearing in Swarms*, 1 book, *On Biting and Stinging (Animals)*, 1 book, *On Animals Which Are Said to Be Jealous*, 1 book, *On (Animals) Which Dwell on Dry Land*, 1 book, 5.44, *On (Animals) Which Change their Colors*, 1 book, and *On (Animals) Which Live in Holes*, 1 book.
21. V. Rose, *De Aristotelis Librorum Ordine et Auctoritate* (Diss. Berlin, 1854) 7–8, H. Usener, *Analecta Theophrastea* (Diss. Berlin, 1858; rpt. in his *Kleine Schriften*, vol. 1 [Leipzig, 1912]) 14, Regenbogen 1429–30, Keaney 298 n.2 and M. Sollenberger, "Diogenes Laertius 5.36–57: The *Vita Theophrasti*", *Rutgers University Studies in Classical Humanities* 2 (1985) 49.
22. P. Steinmetz, *Die Physik des Theophrastos von Eresos*. Palingensia: Monographien und Texte zur klassische Altertumswissenschaft (Bad Homburg, 1964) 10–13 and 348–53.
23. See, for example, the comments of H. Gottschalk on this reconstruction in his review of Steinmetz' book in *Gnomon* 39 (1967) 17–20.
24. Themistius, *In Aristotelis De anima* 6, 3.5 530a25 (*CIAG* vol 5.3 p. 108.11).
25. Diogenes, however, lists *On the Soul* as containing only one book (*thesis mia*). But see the remarks of Sharples (1985) 185.

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26. Simplicius, *In Aristotelis Physica* 8.5 257b6 (CIAG vol. 10 p. 1236.1).
27. That they did concern motion is made clear by the references of Simplicius, *In Aristotelis Categorias* 14 15b1 (CIAG vol. 8 p. 453.24–31), *In Aristotelis Physica* 1.1 184a16 (vol. 9 p. 20.19–25), *Corollarium de loco* (p. 604.5–11), 5.2 226a23 (vol. 10 p. 860.19–28), *In Aristotelis De anima* 3.9 432a15 (vol. 11 p. 286.27–34) and Proclus, *In Platonis Timaeum* 35A-B (vol. 2 p. 122.10–17 Diehl). See also Regenbogen 1396–7, Steinmetz 11–12 and 348–52 and Gottschalk 18.
28. See above, note 3.
29. See Regenbogen 1423.
30. Cf. *HP* 1.10.10, 1.11.3–6 and 1.14.1–2.
31. See also *HP* 1.2.1, 1.11.1 and 7.1.7 and *CP* 1.1.1, 1.7.3 and 4.3.5. On Theophrastus' basic agreement on this purpose of plants with Aristotle (e.g., *Phys.* 2.8 199b9 ff., *Meteor.* 4.3 380a11–15 and *GA* 1.2 717a21 ff.) see G. Wöhrle, "Die Teleologie in den botanischen Schriften des Theophrast: Abkehr von Aristoteles?", *Würzburger Jahrbücher für die Altertumswissenschaft* n.F. 10 (1984) 47–55, and *Theophrasts Methode in seinen botanischen Schriften*, *Studien zur antiken Philosophie* 13 (Amsterdam 1985) 84–95.

3

Theophrastus and the Study of the Intractable: Scientific Method in *De lapidibus* and *De igne*

John Vallance

Theophrastus' scientific method in the *De lapidibus* (*Lap.*) and *De igne* (*Ign.*) is not easy to describe. Traditionally, some scholars have condemned these two short treatises as fragments or epitomes.¹ Some have gone so far as to deny that they display any organized method at all. Mineralogists have long been puzzled by the vague references to many minerals and earths, and their provenance, in the *Lap.*; what, they ask, is the scientific use of a reference to "a stone found at Tetras in Sicily" (*Lap.* 15), "another stone like charcoal" (*Lap.* 39), and so on?² In the case of the *Ign.*, Victor Coutant concluded that "a comparison with Aristotle's *Meteorologica* or with Theophrastus' own botanical works illustrates the differences between the organized, logical, progressive presentation and a scrappy collection of remarks".³ Steinmetz decided (sensibly in my view) that the works were lecture notes of some kind, but was perhaps a little overzealous in dividing them up into *Vorlesungsthemata*.⁴ There have been a number of similar attempts to account for what might seem to be chaotic attempts at something Aristotle did rather better.⁵

Some, on the other hand, have seen in these two works evidence of Theophrastus striking out on his own, often putting a fair amount of distance between himself and Aristotle. *That* Theophrastus comes across as a cautious scientist uncomfortable with generalizations, critical of his sources and just as often prepared to be critical of his own theories. This might be thought consistent with the attitude of one who apparently cast doubt on the application of Aristotelian teleology, element theory, and therefore on fundamental aspects of Aristotelian method.⁶

In this paper I want to make two points. The first may seem unexciting on

its own: there is no clear evidence that Theophrastus criticized Aristotle's method of inquiry in natural science. The target of much of the polemicizing found in his natural science was Plato's Academy, and Theophrastus can usefully be seen reacting against the growing influence of the *Timaeus* as a fundamental scientific text. Second, this disagreement with the Academy forms a useful background against which to evaluate some of the problematic aspects of the *opuscula*. I will suggest that neither of the standard positions I outlined above is necessarily correct. While my discussion will center on *Lap.* and *Ign.*, the conclusions I reach will relate more generally to Theophrastus' natural science and its later influence.

Theophrastus does not discuss his method of approach explicitly in either *Lap.* or *Ign.* Given the newness of their subject matter, this may seem surprising to us. Yet even in the botanical works there is nothing to correspond to the extended methodological introductions of, say, the *Historia animalium* or the *De partibus animalium*. We might conclude from this that Theophrastus was able to expect a good deal of sympathy and understanding from his immediate audience, whether it was in the lecture room or study. It is also possible that there are some methodological works that do not survive (although the list provided by Diogenes gives no clear indication); it is far more likely, however, that Aristotle's own work was so firmly fixed in his mind that general methodological excurses were unnecessary. How, then, should those features of Theophrastus' natural science that traditionally have been held to set him apart from Aristotle be explained—his cautiousness, scepticism, his criticisms of teleology? What of the other cases where Theophrastus is supposed to have criticized Aristotle?

First, *Lap.* and *Ign.* need to be located in Theophrastus' general scheme of inquiry in natural science. Theophrastus accepted the basically Aristotelian hierarchical division of the natural world. In a long section that runs to the end of chapter eight of his *Metaphysics*, he delineates all the major areas of study from astronomy (and what is still "higher") down to the terrestrial phenomena, animals and plants. The Theophrastan natural scientist should inquire about first movers, the heavenly bodies and their final causes (9b24ff.), and individual positions and relations before coming down (*hupobainein*) the scale until animals, plants, and finally inanimate things are reached. At 9a10 he argued that "knowledge is of many kinds"; each of the above areas will have a type of knowledge and method appropriate to it.⁷ The extent to which the search for causes is to be taken and the type of causes that the scientist should seek will depend on the subject. The "higher" the inquiry that is taken, the more likely it becomes that reason will have to take over. On the other hand, in the case of lower levels, order will be less apparent, and the scientist needs to set a limit to his explanatory requirements.

This lack of order did not, as we know, discourage Theophrastus from

going out of his way to concentrate on this area. At the beginning of this work (4a2–3) he had referred to the study of nature as *poluchousterá* “more varied” than the study of first principles, distancing himself from those (identified by a sardonic “tines”) who held the works of nature to be *ataktotera*.⁸ Theophrastus’ word is used often in the botanical treatises in the sense of “bountiful” with an added hint of “variety.”⁹ Certainly it has a positive connotation, and its use perhaps gives some insight into the specific interest in botany and mineralogy which, in a sense, distinguishes him from Aristotle.

While Theophrastus held that clarity in these subjects comes from being able to distinguish *eidē* “as far as possible” (for an example, see *HP* I.3.1), such distinctions should only be thought of as applying “in general and on the whole” (for example, *HP* I.3.2). This need not imply cautiousness of any sort. The *Metaphysics* gives the overall impression that the location of the boundary between different areas of study is one of the first tasks facing the natural scientist. Yet at 7b5ff. Theophrastus centers the problem of assigning *logoi* to all things on the difficulty of finding the “point which separates what is ordered from what is not.” There is a point, he suggests, where the scientist either finds he is looking for more *taxis* than there actually is, or that his work leads him to the conclusion that nature could be held responsible for what is worse rather than better.¹⁰ In practice this meant that the natural scientist could expect to find himself at a loss to explain many particulars, especially at the lower levels. Analogy drawn with other things, sometimes even from a different level, could often help, but was fallible. At *HP* I.1.3–5 (and cf. I.1.12) Theophrastus offers a critical discussion of the extent to which analogies between plants and animals are useful. The effects of such analogies in Theophrastus’ vocabulary of plant physiology are obvious. The kinds of analogies with animals that inform views on, say, plant reproduction, are also ultimately behind Theophrastus’ assertions about the sex of minerals (for example, *Lap.* 5, 30–1). Like Aristotle, Theophrastus seems to have held that the extent to which matter is privileged in explanation is inversely proportional to the importance afforded purpose-directed activity.¹¹ Purpose-directed activity, in turn, becomes less common at the more disordered levels of existence. The extent of application of teleology, then, becomes a crucial determining factor in Theophrastus’ scientific method in general; the effects of a teleological approach, however indirect, are no less in evidence in *Lap.* and *Ign.* than in the botany and suggest that purpose-based explanatory systems can actually be more flexible than is sometimes supposed.¹² Far from being a hindrance, Theophrastus’ doctrine actually opened the way for the study of subjects such as mineralogy.

To demonstrate this, I will have to challenge a number of conventional assumptions surrounding Theophrastus’ reaction to Aristotelian teleology. Once again, Theophrastus’ *Metaphysics* is a convenient starting point. The

notorious ninth chapter deals with the methodological implications for the natural scientist of the wider discussion of the relations between intelligibles and the physical world that has preceded it. Theophrastus' main concern at this point surrounds the status and application of final causes in nature.

With regard to the view that all things are for the sake of an end and nothing is in vain, the assignation of ends is in general not easy, as it is usually stated to be (where should we begin and with what sort of things should we finish?), and in particular some things are difficult because they do not seem to be for the sake of an end, but to occur, some of them, by coincidence, and others, by some necessity, as in the case both of celestial and of most terrestrial phenomena. (10a21–8, tr. Ross and Fobes)

The chapter as a whole asks two broad questions:

1. Granted that there exists in nature purposive activity (and Theophrastus nowhere doubts this), by what criteria can we detect and identify it, distinguishing it from those cases where purpose is not to be found?
2. What are the implications of this for our choice of explanatory accounts? Is goal-directed activity to be a relevant part of them, or should we privilege the "type of explanation associated with Democritus"? The section is polemic in character. This much is clear. Theophrastus brings on a number of disturbing examples of dysteleology—cases where he evidently feels that privileging the final cause does not offer a satisfactory explanation of what is happening. This has been taken as a thinly veiled attack on Aristotle. Elsewhere, and especially in the botany, Theophrastus seems committed to Aristotelian teleology; he certainly is prepared to repeat his master's statements about its application to natural science. Such a contradiction between the methodological difficulties that he seems to perceive so astutely in the *Metaphysics* and an apparent inability to suggest any answers and incorporate them into his own practice is a serious one. In a sense this is the kind of contradiction that informs many modern negative assessments of Theophrastus.

Let us consider a few of his examples of dysteleology:

What then is the purpose of the advances and regressions of the sea, [of extensions of the land], of droughts and humidities, of changes and generations in general from one thing to another, [of alterations and changes which take place into other things of things which exist within the earth itself], and of a good number of similar cases? In animals too some things are all but useless, such as breasts in males, the female emission (unless this does add something), beards, or generally speaking, outcrops of hair in certain places in some creatures. (10a28–10b11, Brackets inserted by Usener, followed by Ross and Fobes)

Taken singly these cases of dysteleology may not amount to much, but together they demand a reinterpretation of the whole chapter. All come from

what the ancients called “meteorology” or from zoology; that is, from the “lower” levels of nature. The first surrounds “*ephodoi*” and “*anarrhoiai*” of the sea. The traditional view is that this is a reference to the tides. Yet according to *LSJ*, these words do not occur elsewhere with this sense. There is no exact parallel to this case in Aristotle, so it could be argued that the example is Theophrastus’ own. Alternatively, it could be that Theophrastus is distancing himself from Aristotle in his use of new terminology. The words used by Theophrastus do not appear in the passage in Aristotle’s *Meteorology* (II.1, 354a6ff.) to which this reference in the *Metaphysics* is often referred. Here Aristotle instead uses “*talanteuein*” of a surging to and fro of the sea which is noticeable in areas where it is closely confined by land. Aristotle is trying to prove here that the sea has no sources as rivers do, yet that this surging is somehow caused by the rivers that flow into it. It is hardly surprising that he does not play up the evidence for large-scale movement in the sea because that might be damaging to his hypothesis. (Especially when we remember that the Mediterranean as a whole is not particularly tidal.) In general, and specifically in this work, Aristotle seems to have been innocent of tidal movement.

On the traditional view, that Aristotle is under attack here, we might imagine that Theophrastus is begging the question “if these movements, however slight, are not indicative of the sea having sources, what are they there for?” There are a number of reasons for suspecting that this view is misguided. If it is the case, then Theophrastus is ignoring Aristotle’s own explanation altogether (at *Meteorology* II.1, 354a12ff.—that movements are caused by rivers flowing into the sea). Furthermore, Aristotle made no attempt at all to explain these movements teleologically. The standard ancient view was that Posidonius was the first to provide a detailed account of the tides, and there is no real evidence to suggest that this is not correct. There is actually a closer parallel in Aristotle to this passage in Theophrastus, a passage that suggests that Theophrastus is not speaking of tides at all. The central concern of *Meteorology* I.14 is that the same parts of the earth are not always wet or dry; rivers appear and disappear.

As far as the sea is concerned, in places it recedes and in others it advances; it is continually evident that the same parts of the earth as a whole are not always sea, nor always dry land, but rather that all changes in time. (353a21ff.)

Aristotle maintains that this takes place in an ordered cycle. The changes on the earth’s surface are indirectly referred to as *pathēmata* (352a18), and these are necessitated by larger cyclical changes. That is to say, they are side effects and as such do not submit to explanation in terms of purpose. We might suppose that Theophrastus would account for such things similarly in terms of the species of necessity, which he mentions at *Metaphysics* 10a21–7. Such an interpretation certainly fits the text of Theophrastus better.

Usener, and after him Ross and Fobes, athetized a large section here, thinking that the remains of a later version of the passage were superimposed on the first. This was without reason. There is in fact no reason to remove the reference to "extensions of the land" (*prochōrēseis*); it need not be a gloss or repetition of what has come before. In this passage Theophrastus refers to advances and withdrawals of the sea (that is, variations in sea level), and cases where land extends into the sea (as in the case of sedimentation at the mouths of the Nile mentioned by Aristotle at *Meteorology* I.14 351b30. This also obviates the need for Usener's addition of *anachōrēseis* to balance *prochōrēseis*). Theophrastus goes on to note droughts and excessive periods of humidity along with alterations that take place within the earth itself (perhaps the formation of metals and minerals; cf. Aristotle *Meteorology* III.6, 378a12–378b4); the second deletion (of "alterations and changes which take place within the earth") is also unnecessary.

If Theophrastus is in fact thinking of this Aristotelian context here (and this seems very likely), then it is still just as hard to see exactly where his criticism of Aristotle might lie, as it was under the traditional interpretation. The case is the same with Theophrastus' other examples. Such things as breasts in men, "the secretion peculiar to women," hair in odd places, and so on, would also fall under the Aristotelian heading of *pathēmata*. The secretion was regarded by Aristotle as a *perittōma* (GA 726b31ff., 728b26, 737a28), analogous to semen in males, but in need of "working up."¹³ As far as utility goes, Aristotle says it has none at all; it is like a number of other bodily fluids and secretions. Among them, for example, bile is specifically designated as *ouk heneka tinos* at PA 677a13ff. "Inessential characteristics" were of course dealt with by Aristotle in the last book of the GA. Many see this book as a rather unimpressive advertisement for teleology, but in reality it demonstrates the flexibility of the approach as Aristotle took it up. At GA 778b12ff. he made his position clear, saying that "everything in nature is for a purpose," and the information for this is contained in the *logos* of each thing. The secondary characteristics, however, come about during the process of coming to be, and therefore do not fall under this heading. So if I say, "I must of necessity have an eye and it must of necessity be a blue one," I am using two different species of necessity. (On the coexistence of different types of explanation in Aristotle, see *Phys.* II.3, 195a5.) Without going into the Aristotelian background here (the idea is developed in book one of the PA; the whole subject has been brilliantly treated by Richard Sorabji among others), I conclude that Aristotle, like Theophrastus, was aware of the need to limit the extent of application of his teleology and thereby provide for the explanation of phenomena that do not necessarily fit general theory. On the basis of the evidence furnished by the *Metaphysics*, it seems unlikely that Aristotle is under attack at all. To be sure, Theophrastus finds some teleological explanations problematic, but he does not think that

Aristotle failed to notice these problems. Nor does he go further than Aristotle had in seeking solutions. His examples of dysteleology seem to be based on Aristotle. The mention of Democritus at the end of the *Metaphysics* and the rejection of his position places Theophrastus more firmly still in line with, say, the final chapter of the *GA*, where Aristotle employs very similar arguments against the same man.¹⁴

Who is Theophrastus attacking then? The real butt of the attack, in my view, is Speusippus, along with “Plato and the Pythagoreans.” In their own ways, both Plato and Speusippus are accused in this last chapter of the *GA* of actually damaging teleology, Speusippus by granting his *timion* no direct causal influence on nature, and Plato by doing this in a more roundabout way. By setting up the *One* as the active principle that imposes order on the *Indefinite Dyad* (the substrate of the physical world), correcting excesses and defects, Theophrastus argues that Plato ultimately destroys teleology through his very attempt to extol its worth. The argument at *Metaphysics* 11b7ff. seems to progress as follows:

1. God can only guide things to what is best as far as possible. (Compare Plato’s own remarks to this effect at *Ti.* 29e.)
2. It is possible that he wouldn’t choose to do this at all if it involved “snatching away” reality, which is made up from opposites and exists within them (ie., overriding the dyad would be overriding a first principle).
3. But what we actually see is much disorder and apparently purposeless activity in nature. There can be two explanations. Either a) God does not choose to override this principle or b) God is incapable of doing this in all cases. If a), then God is allowing nature to act in vain; if b) then God is not sufficiently powerful to warrant his name.

It is against this kind of “hard” teleology that Theophrastus’ examples discussed earlier seem to be directed. Or, to put it plainly, Theophrastus is arguing against the Platonic insistence on the primacy rather than mere relevance of purpose-based explanation. Rather than attacking teleology, Theophrastus delivers in the *Metaphysics* a lively, astute defense of it against what he sees as ill-considered attacks from various members of the Academy. Thus we can reconcile the evidence of the *Metaphysics* with Theophrastus’ frequent positive assertions about teleology in the botanical works.

If Theophrastus emerges as a dyed-in-the-wool Aristotelian, this is not to say that he uncritically employed the explanatory frameworks of his master in all cases. In initiating research into some “lower” areas of nature not dealt with by Aristotle at all, he found it necessary to place somewhat different demands on the systems of explanation that he inherited. Yet such modifications and developments tend to be on minor points only; I shall look at a few of these

presently. Certainly, in the botanical treatises, Theophrastus is looking over his shoulder at Aristotle. At the beginning of the *HP* for example, it is clear that he has derived his list of *diaphorai* of plants from the Aristotelian list in the first chapter of the *HA*, simply by subtracting (reasonably enough) *ēthē gar kai praxeis*. The list of the *diaphorai* of stones comes at a similar stage in the *Lap.* and represents another modification to fit yet another step down in the order of creation. (With the list of differences at *Lap.* 3, compare the differences of plants at *HP* 1.4.1–4 and note especially, in the case of stones, Theophrastus' assertion that the differences are most in evidence when they are most pure, *Lap.* 2.) I have not found any cases of Theophrastus using *pathēmata* in the Aristotelian sense, although when, at *CP* 1.16.10–11, he is faced with the problem of whether cultivated or wild plants are more "natural," he takes the following line:

... are we to study the nature of a plant in those that grow without human aid, or in those growing under various forms of cultivation, and which of the two kinds of growth is more natural? ... And in animals too, one must not count as natural those cases where moulding or forcing produces small or large size, or a general physical outline. The nature instead always sets out to achieve what is best, and about this (one may say) there is agreement. (Tr. Einarson and Link)

This acknowledgement that not all plants and animals are necessarily perfect, whether "natural" or "artificial" (although this does, of course make a difference), indicates that Theophrastus, like Aristotle, could in practice employ teleological restraints. And he does, in fact, use various analogous terms for "secondary" effects—among them, notably, *sumptōmata*, *ta sumptōmatikos*. These terms are also used to describe individual cases where he has suspended judgement because explanations are not readily available. So, at *HP* VII.14.1–15.3, he treats a group of plants with particular properties, some of which he can explain, and others he cannot. He ultimately attributes the *diaphorai* of these to both *physikai* and *sumptōmatikai* causes. At VII.15.3 he calls some of the troublesome properties *peritta*, saying that however interesting they might be as particulars, they are red herrings as far as his general inquiry goes. He is not even prepared to suggest an explanation, while leaving open the possibility that one might exist. He makes his position still clearer at *HP* I.4.2–4. Differences are natural (*phusikai*), but any attempt at classification on the basis of them will lead to exceptions. For instance, an attempt to classify plants as land-based or aquatic will yield exceptions such as the tamarisk, willow, and alder in the first group, palm, squill, and asphodel in the second. Theophrastus continues:

But such cases, and in general such a line of investigation [ie. getting bogged down by exceptions] does not represent the right method. For nature does not hold on to necessity in these cases. We should grasp our divisions, and in general the study of plants in this way. (*HP* I.4.3)

This does not of course stop him from introducing unusual examples for their interest value. *HP IX* provides a feast of *peritta*.¹⁵ What drug sellers and root cutters might tell you is sometimes a little “over the top” (note the use of *epitragōdein*), but it is useful nonetheless, he says at *HP IX.8.5*; he mentions a number of their stories only to reject them. As far as criticism of his sources is concerned, we can appreciate Theophrastus’ difficulties here. Reports are not necessarily to be doubted simply because they are extraordinary, he says at *HP IX.18.2–3*. In practice, he doubts only the most outrageous, though even then he still includes it. He relates a fascinating tale about ritual elements involved in gathering cinnamon, only to finish with the remark “but this is really just fable” (*HP IX.5.2*). A story about Cretan goats eating dittany after being shot by hunters in order to eject arrows is prefaced by a fairly noncommittal “they say it is true” (*HP IX.16.1*). On the other hand, the note at *HP IX.10.4* to the effect that some men purify their horses with black hellebore and incantations is made without any suggestion that Theophrastus failed to see reason in what they do.

Closer to home, in the *Lap.*, Theophrastus mentions *mirabilia* such as “stones that give birth” (*Lap. 5*),¹⁶ “*spinos*,” a stone that burns all the more fiercely when water is sprinkled on it (*Lap. 13*), “a stone found in the mines at *Scaptē Hylē* which burnt when olive oil was placed on it (*Lap. 17*), the “*lyngourion*” (*Lap. 28*) and so on. Of these, only the last is explained, and even then it is explained in a “one off” sort of way: the *lyngourion* is congealed lynx urine. Similarly, at *De ventis 17*, he leaves open the exact nature of individual connections between sun, moon, and winds saying that “we must consider whether these [connections] take place *kata sumptōma* as is the case at the rising and setting of the stars.” (And compare *De ventis 31*.) One case that might be thought even more potentially damaging to “hard” teleology occurs at *HP III.9.5*, where Theophrastus reports a species of fir that contracts a disease on account of its own *eutrophia*. But it causes no lasting concern, since it is “an affection peculiar to the fir.” What frequently passes for caution in the *Lap.* and *Ign.* (in expressions such as “if it is true,” *Lap. 5*, or “they say,” *Ign. 44*) tends to occur in situations such as these, where there is little ultimate risk to the integrity of Theophrastus’ underlying theory. Implicit in all these cases is the idea that explanations, when and where they become available, will not necessarily cause too much harm. As he says at *Metaphysics 10b24*,

The very supposition that they have no explanation is difficult, and especially for people who do not make this supposition in the case of other things that are prior and of higher worth. For this reason there seems to be some plausibility in the view that after all it is fortuitously (*tōi automatōi*) and by the rotation of the universe that these things acquire certain forms or differences from one another. (Tr. Ross and Fobes)

There is no *need* for a general explanation of the *peritta* which will bring them into line with each other; when Theophrastus sets aside discussion of

coral and the "Indian reed" at *Lap.* 38, it is because he does not want to get bogged down in an individual case that shows that the assumed distinction between plant and stone can sometimes be unclear. When he casts doubt on accepted views of how pumice is formed at *Lap.* 20–1, it is almost as if he has decided *a priori* that substances at this level of creation may well have multiple modes of generation (as he in fact says at *Lap.* 2). This is what seems to be behind many of the cases of multiple explanation in *Lap.* and *Ign.* Such a position can, then, be used to permit the inclusion of troublesome details without necessary risk to theory. But this is just one, perhaps cynical way of looking at it. It certainly does not account for the positive heuristic aspects of Theophrastus' method. At *HP* III.1.4–5 Anaxagoras, Diogenes, and Kleidemmos are criticized for not accounting for the variety of evidence sufficiently in their theories of spontaneous generation. Theophrastus disagrees with those who say (*Ign.* 14) that cold can "concoct" (*pettein*) crops and can burn them just as heat can. He disagrees not because their observation is incorrect, but because the action of cold is not *proëgoumenōs* but "incidental" (*kata sumbebēkos*), and it should be explained as such. Cold gathers the heat, but the heat remains the active factor. Theophrastus shows no dissatisfaction with his own explanation; indeed, he elaborates on it in the succeeding sections. The "lower" the area of nature in terms of the amount of order exhibited, the more Theophrastus is led to concentrate on these particulars and peculiarities. To take just one more example from *HP*-VI.3.1–6: Silphium is a very unusual plant, and Theophrastus quotes two accounts of its growth pattern and medicinal properties before coming down in favor of neither, saying, "we should consider which of these reports is to be believed." The example does not detain him further. Whichever account he finally accepted, it would not affect his main point, that silphium is in the class of *narthēkōdē* plants.

By the time we reach the levels of phenomena dealt with in *Lap.* and *Ign.*, the study becomes even more concerned with *idiotētes* and *peritta*. At the level of minerals and earths, a new category appears: that of "useful substances." The two works are similar in scale. Both begin with a short theoretical introduction before going on to examine particulars. *Lap.* 1–3 discusses the formation of stones and earths, with a brief reference to another theory on metals which was treated in another work. *Lap.* 4–47 is concerned with describing different types of stones, grouped loosely into categories of "active" and "passive," "fusible" and "non-fusible," "combustible" and "non-combustible"; sections 48–69 deal with earths. At *Ign.* 1–10 Theophrastus discusses the status of fire as an element. In 11–76 he takes note of and explains a wide variety of particular terrestrial manifestations of fire that require individual attention (for example, see *Ign.* 62). Let us consider the character of the initial theoretical remarks first. At the beginning of the *Lap.*, Theophrastus outlines what is to be his subject. Modern scholars tend to classify it as "mineralogy,"

but this is somewhat misleading. He simply discusses “stones” and “earths” in general in so far as they come from “earth.” In the first forty-eight sections, he is mainly interested in “those types of stones which are rather unusual, and those kinds of earths which have peculiar natures marked by their colour, smoothness, solidity, or some other faculty.” They may originate in a number of different ways, and Theophrastus gives only two such examples (*Lap.* 2). The theme, not only of the “unusual,” but in many cases of the specifically “non-categorizable” and “non-definable,” underlies the whole work; indeed, Theophrastus shows no interest in making generalizations about, say, the constitution of the earth’s crust, or processes that may determine the geological structure of a wide area. There is no evidence that he would have expected order on such a scale. Some substances are unusual because of their usefulness to man (for example, see *Lap.* 12, 16, 22, 24), their value, or more simply because of their peculiar properties. *Lap.* 2 suggests that the more “pure and homogeneous” stones possess a greater number of *diaphorai*, and Theophrastus hints that the “priority” of mineral substances is in some way related to the number of distinct properties they present. Hence at *Lap.* 48 he claims that the *diaphorai* of earths are less numerous than those of stones, and they are more peculiar (*idiōterai*). What classification there is in this work is done in terms of these or other *diaphorai*, but it is hardly rigorous.

The introduction to the *Ign.* provides more material for us to work on. Here too Theophrastus is concerned with the singular and unusual. Only in this case, the data he presents do pose a threat to his theory. It is interesting to see how he responds. Fire, he argues, is one of the simple bodies (and he says this directly in the first line of the work), but of them all, it has the most particular qualities and certainly does not appear to be of the same kind as the other elements. In its earthly manifestations it cannot survive without fuel, but exists in a substrate. Primary, elemental fire could not burn, since burning presupposes generation and destruction rather than being (*Ign.* 3). As a result, he presses for a redefinition of these simple bodies in general and a reexamination of fire’s elemental status in particular (*Ign.* 8). It is important to note that Theophrastus himself canvasses the idea that different kinds of fire exist, one of which may be elemental, without going into this in detail (*Ign.* 4 and cf. 57 for the *diaphorai* of the terrestrial kinds).

But exactly what kind of redefinition is Theophrastus advocating? He is generally credited with presenting here some powerful arguments against a cornerstone of the Aristotelian four-element theory. This need not be so. At several points in the first ten sections of the *Ign.*, Theophrastus distinguishes his own discussion of fire from a discussion of “first causes” or “higher and prior things” (7, 9, 10, and cf. 8). In section eight, he suggests that no element exists in nature on its own, but that each possesses a wide variety of *eide* through combination with other substances (cf. 9). Just as *Lap.* deals with

some examples of compounds that implicate "earth," without necessarily casting doubt on the ultimate existence of earth as an element at some level (cf. especially *Lap.* 48), so *Ign.* deals with those that involve fire. If the *prôtai aitiaí* surround the status of fire or heat as an element (*Ign.* 7), Theophrastus is concerned with the lower and more varied levels (*Ign.* 10), and he clearly sees this as separate study, requiring a different approach.

What difference there is between Theophrastus and Aristotle seems to lie in this area, and it presents itself in the form of a growing willingness to admit to the variety of nature even at levels that do not submit to general explanation. Herein may lie Theophrastus' greatest contribution to the development of natural science. *Lap.* and *Ign.* may well have been the first works of their kind. Evidence for the descriptive study of minerals and earths before Theophrastus is hard to find. (The myth at the end of the *Phaedo*, *Timaeus* 58–61, and various scattered references in classical literature do not really suggest sustained interest.) They also present a vast amount of information, given their length. On one hand, these works represent a significant move toward the admission of more empirical data in works dealing with natural science. On the other hand, I have suggested one reason why this increase in the volume of information presented did not result in the formulation of major new theories. We have here one possible line of development along which to trace the growth of interest in "*mirabilia*" and, more specifically, in "*problems*" in later Greek science.¹⁷ Theophrastus is in a sense open to the criticism that his method did not sufficiently provide for criticism of theory on the basis of challenges from this kind of data.

Nor does it always follow that this information represented new data derived from Theophrastus' own specialized investigations. Evidence for learning it certainly is (to use Lloyd's categories),¹⁸ but a distinction between what is commonly known and the results of specialized investigations is much harder to make. Yet if Theophrastus was actually engaged in original and practical research, then we would expect to find evidence of this too, even if our inadequate knowledge of ancient literary *endoxa*, not to mention nonliterary sources, makes this a highly speculative field. Nor should it be assumed that Theophrastus' approach to collecting information in the *Lap.* is necessarily the same as that in the botanical works, whose subject is more easily organized. We would expect what evidence there is for research to present itself most clearly in areas such as the nature of sources and in specific attitudes to "empirical" techniques like experimentation and measurement, and it is these that I want to consider next.

There are a number of problems before we even begin. What status, for instance, should we afford the analogy between running water and flame at *Ign.* 55 when it is also a well attested poetic metaphor? The poetic metaphor no less involves close observation of some properties common to flames and

streams of water, yet in Theophrastus, the analogy assumes a different character because it is invoked to elucidate a scientific problem. Difficulties caused by the lack of any developed scientific terminology may also confuse this distinction; common words are frequently used in a specialized sense. As Eichholz *ad loc.* pointed out, there are three different uses of *gē* in the first two sections of the *Lap.* The mineralogical nomenclature in the *Lap.* presents similar difficulties. For example, *anthrax* can be a kind of gem (*Lap.* 8, 18, if indeed these are the same), charcoal (*Lap.* 12, 16), and a particular kind of "hexagonal" gemstone from Miletus (*Lap.* 19), and so on.¹⁹

By the same token, it cannot be assumed that the mere presence of specialized terminology, where it does occur, indicates any specialized knowledge, let alone specialized research. With his use of such terms as *psuchagogeia* (*Ign.* 24), *rhabdos* (*Lap.* 25), and *spelaois* (*Ign.* 70) compare the even more detailed language on the same subject used by Xenophon in a treatise concerned not with science but with financial administration (*De vectigalibus* IV.25–32). We might assume that it was well known in Attica that miners often suffocated (*Ign.* 24, 70), that bellows were used in forges to increase the intensity of the heat (*Ign.* 29, 37), and that doctors cauterized warts (*Ign.* 37). He draws on similarly straightforward examples when he speaks of the warmth of public bath houses in winter (*Ign.* 13) and the use of cold water in reviving unconscious people. More problematic are his accounts of the preparation of white lead (*Lap.* 56) and verdigris (57).

Most of the information Theophrastus gathered for the *Lap.* is not directly acknowledged, and in most cases the evidence does not permit any distinction between aural and literary sources (though Democritus is mentioned at *Ign.* 52 and Gorgias at *Ign.* 73). This is not always the case in the botanical treatises, where the combined use of *phasi* and acknowledgment of help from woodmen, rootcutters, and others may suggest that Theophrastus or an assistant had actually gone out into the field. Yet conviction on this is impossible: drugsellers, rootcutters, and scientists could just as easily have seen each other every day in the Agora. When he refers to copper mines in Cyprus (*Lap.* 25), there is no suggestion that he actually went there; nor, for that matter, is there an abundance of mineralogical evidence from Attica quoted in the *Lap.* In line with an ancient tendency, which was certainly amplified by those returning from Alexander's expeditions, the East is the mysterious source of a number of the more unusual reports.²⁰ Such data are almost certainly second hand. As in the botanical works, fundamental sources tend not to be specified, and acknowledged debts relate to minor points only. Diocles is quoted at *Lap.* 28 to support the notion that the *lyngourion* can attract pieces of copper and iron as well as leaves and chaff. At *Lap.* 24 the Egyptian *anagraphai* are cited somewhat sceptically on the matter of a giant *smaragdus*. Indeed, a barely concealed doubt can be seen in Theophrastus

towards all the sources he names; this seems to be a general feature of his work. Named sources stand for interpreters of the evidence, like himself; woodcutters, smiths, drug sellers and so on provide the raw information and therefore are treated differently.

As for experiment and measurement, the problems are still greater. Only if the term "experiment" is thought to encompass simple tests could it be said that Theophrastus recognized its use. Yet in the absence of sophisticated equipment, practical investigation of minerals would have been limited to observations of surface properties and densities. This is in fact the procedure that Theophrastus recommends at *Lap.* 4; significant from a modern point of view is his realization that hardness is an important *diaphora* of minerals. Whether he used such a technique himself, however, is doubtful. The remarks on the relative hardness of gemstones at *Lap.* 43 look as though they may well come from gem carvers themselves. In addition, there is no evidence that he made a consistent attempt to weigh minerals and classify them in that way, even though he could have. When he states at *Lap.* 4 that the "*smaragdus*" imparts its own hue to water, it is unlikely that he used this as the basis of a test, say, to distinguish different kinds of "*smaragdus*." Nonetheless, Theophrastus' list of *diaphorai* is an astute one; suffice it to say that when Agricola came to write his own mineralogy (the *De natura fossilium*, Basle 1546), he could only add *sapor* to this list.

There are several cases in the *Ign.* where experiments may have been performed; for each the evidence is inconclusive. Furthermore, in each case, an incorrect conclusion was reached from "correct" observation. At *Ign.* 23, Theophrastus correctly noted that fire is extinguished when shut off from the air, but he explained this in terms of its need to find a void into which it can move. He observes at *Ign.* 65 that lime gets hot when water is poured on it, but this leads to the conclusion that water acts as a fuel. Milk boils faster than water, therefore it gets hotter (*Ign.* 49). The discussion of flame at *Ign.* 50–6 has been cited as an example of attentive observation leading to a refutation of earlier, more abstract views.²¹ But the conclusion reached here, that a flame comes to a point because it is cut off by the surrounding air, is not one that could be tested empirically. Indeed, it does not even follow that Theophrastus had a lamp in front of him when he wrote this passage.

This kind of criticism eventually, I think, misses the point about Theophrastus' aims in these two works. There are compelling reasons to suspect that Theophrastus himself knew perfectly well that he was embarking on the study of extremely difficult material, but material which nonetheless represented an important level of nature that had been neglected. To this extent, we do have before us two examples of original research. The level of Theophrastus' ultimate dependence on Aristotle in his own work in natural science is greater than has sometimes been suggested.²² It is not necessarily correct to see Aristotle as the target of very much of Theophrastus' polemicizing in the

opuscula. This will seem an unexciting conclusion to those who have wanted to play up Theophrastus' intellectual independence and originality. But this is not to detract from his importance in opening up new areas of study.

There is clear evidence that Theophrastus' interests were not the same as his master's. Consider, for example, his consistent use of words such as *poluchous* to describe what Aristotle might have regarded as "disordered." We also have some promising lines along which to follow the development of the pseudo-Aristotelian tradition of interest in "problems." As for *Lap.* and *Ign.*, they fit together in that they both deal with what one might call the *poluchoustata* aspects of nature. They are both concerned with the phenomena associated with the combination and alteration of elemental substances on the earth, and not at all with the existence of fire and earth *qua* elements. The data that Theophrastus chooses to mention are often significant because they are useful to man (and an anthropocentric teleologist Theophrastus certainly was). But as presented in these treatises, they are "unusual" and intractable. They are the *symptōmata* of earth and fire—individual cases—and this is what is behind Theophrastus' familiar refrain: "We must examine this further." The contrast with the method adopted in the *Timaëus* is obvious; perhaps it was a hunger for aetiology and organization which ensured that Plato's great scientific work was the more influential over the few hundred years after Theophrastus' death. Theophrastus would not have been amused.

NOTES

Geoffrey Lloyd read a draft of this paper and made a number of helpful suggestions. The paper's commentator at the Theophrastus conference, Prof. G. B. Kerferd, drew my attention to Gaiser's argument about the composition of the *De igne* which I summarize in note 22 below.

1. D. E. Eichholz, in his edition of the *Lap.* (Oxford 1965 p. 12 and n.1), notes that Schneider had held the work to be an epitome: he referred to our text as "excerpta libri de lapidibus" at vol. iv, p. 535 of his edition of 1818. Wimmer, of course, held both *Lap.* and *Ign.* to be "*Fragmenta*". See Eichholz *loc. cit.* for a fuller discussion.
2. Further examples of this kind of description of provenance may be found at *Lap.* 12, 14, 15, 17, 42.
3. V. Coutant, *Theophrastus de Igne*, Assen 1971, pp. ix–x.
4. P. Steinmetz, *Die Physik des Theophrastos von Eresos*, Bad Homburg 1964, p. 16.
5. I should also note the path followed by James Lennox and Allan Gotthelf in papers delivered to the Cambridge conference on Aristotle's biology in June 1985: they argue that Theophrastus is following a methodological procedure which is directly grounded on Aristotle's *Posterior Analytics*. On their argument, there is an important distinction to be made between aetiological, or explanatory accounts, and more purely "historical" ones whose function it is simply to line up the phenomena for explanation. But such characterizations of *historia* fit works like the *Historia animalium* rather better than they do the *opuscula* of Theophrastus. See also the paper by Gotthelf in this volume.
6. For example, Eichholz *op. cit.* p. 6 "Theophrastus' cautious temper and respect for facts militated against the confident formulation of theories"; Steinmetz *op. cit.* pp.

- 100–1. B. Farrington, *Greek Science* vol. 2, Harmondsworth 1949, pp. 17–27 gives a clear exposition of this view. For an extensive survey of modern views, together with an assessment of Theophrastus' debt to Aristotle in the *opuscula* see now A. M. Battezzato, "Aristotelismo e anti-Aristotelismo del *de igne* Teofrasto", *Elenchos* V (1984) pp. 45–102.
7. For example, see *HP* I.1.4. on the methodological differences between the study of zoology and botany. Aristotle too was aware of difficulties in, say, distinguishing between plants and animals in some cases (*PA* IV.5 681a) but this only strengthened the idea that they were part of the same continuum.
8. Aristotle could well be one of them: at *Meteorology* 338b1ff he describes his subject matter as concerning "those things which happen naturally, but with less order than is associated with the primary element of bodies".
9. There are important examples in the *HP*: "In general the plant is a various and manifold thing, about which it is difficult to generalize" (I.1.10). Compare *HP* I.2.3. The word has the sense "prolific" at *HP* VII.3.4 and VIII.3.4. For a variety of other examples see Wimmer's index.
10. Compare 9b21ff: "For those who demand proof of everything destroy proof and at the same time knowledge."
11. For just one Aristotelian example see *Meteorology* IV. 389b28 ff. I have intentionally taken the example from this book, whose authenticity is still doubted in some quarters.
12. As Sorabji has demonstrated at length in *Necessity, Cause and Blame*, London 1980; Farrington, (*op. cit.*) on the other hand has a rather grim view of teleology.
13. Geoffrey Lloyd has pointed out to me that it is not clear exactly what sort of discharge Theophrastus is talking about here. It is quite possibly not a reference to the menstrual discharge.
14. *GA* V.viii, 789b3–15.
15. See G. E. R. Lloyd, *Science Folklore and Ideology*, Cambridge 1983 pp. 121–35.
16. Although this reading is based on a conjecture.
17. The later *problemata* in particular, with their posing of structured *dia ti* questions and alternative answers come especially to mind here.
18. Lloyd *op. cit.* pp. 135–49.
19. See further on this Eichholz's note to *Lap.* 39. The case is similar in the *Ign.* with the uses of *hygron*. (Contrast *Ign.* 8, 21 and 67 for instance.) On the difficulties in general see *Meteorology* IV, 380b29ff.
20. For example, one might mention the reports from the Euxine about tin and lead "melting" in cold weather (*Ign.* 17), some strange methods of gathering cinnabar (*Lap.* 58) and cf. also the references to Babylon at *Ign.* 44 and *Lap.* 36–7. In the case of the botanical works, these sources are still more clearly defined; see H. Bretzl, *Botanische Forschungen des Alexanderzuges*, Leipzig 1903.
21. It is cited by Coutant *ad loc.*
22. I should also note Konrad Gaiser's argument (in his recent monograph *Theophrast in Assos*, Heidelberg 1985, pp. 32ff) that the *Ign.* was written in Assos, at an early period in his life. This suggests that we should not perhaps expect any reaction against Aristotle in it. Gaiser's argument hinges on the opinion that in a discussion of stones from Assos, the phrase *en kyklōi lithos* (*Ign.* 46) is a reference to a "local stone". But Prof. Pierre Pellegrin has pointed out to me that the phrase is just as likely to mean "a common stone", and Theophrastus need not have been in Assos to have used it. The question of the date of the *De igne* remains open; on balance I still feel that it presupposes knowledge of what Aristotle had to say on the subject.

4

Some Aspects of the Secondary Tradition of Theophrastus' *Opuscula*

Robert W. Sharples

To survey the entire secondary tradition of Theophrastus' *opuscula* would be impossible in a paper of this length and would also make it even more of a catalog of references than I fear it already is.¹ All I hope to do here is to bring to your attention some particularly interesting examples and to give some impression of the general types of issues that may arise. Most of the passages I shall be discussing have been dealt with individually by scholars already. I hope it may be of some use to bring them together in a single discussion.²

I

First, there are the problems caused by Theophrastus' apparent repetition of the same point in more than one work. A particularly clear example occurs in the treatise *On Fish*, where Theophrastus refers to cold water as the reason why octopus are not found in the Black Sea.³ Theophrastus is cited for the same point by Athenaeus,⁴ but there the reference is explicitly to the work *On Differences with regard to Locality; On Creatures that Live on Dry Land*, apparently another title for the work preserved as *On Fish* (sc. "that live on dry land"⁵), is cited by Athenaeus just before, but only for the octopus not taking in sea water.⁶ Clearly the same observation could be of use in more than one context. Another example is the *lyngurion*, the precious stone thought to be formed from the urine of the lynx; this is mentioned at *On Stones* 28, but was also discussed in *On Creatures said to be Grudging*.⁷ Reference is made in both places to the lynx's burying its urine, but only in the latter was the possibility mentioned that its motive in doing so is that it grudges mankind the benefit⁸—though this explanation was then rejected.⁹

Other examples can be multiplied: that seal rennet is good for epilepsy was

mentioned both in *On Creatures said to be Grudging*¹⁰ and in the *Enquiry concerning Plants*;¹¹ that the skin of geckoes, similarly, is good for epilepsy is something for which Apuleius expressly cites *On Creatures said to be Grudging* as opposed to the work, which we know from him and from elsewhere that Theophrastus wrote, *On Epileptics*.¹² It seems reasonable to suppose that the gecko might have been mentioned in the latter work too, though we have no proof.

Moreover, while it may be dangerous to draw any very positive inference from the arrangement of material in the collection *On Marvellous Things Heard* attributed to Aristotle, it is striking that the point about the skin of the gecko appears (section 66) in the middle of a sequence otherwise concerned with hibernation (63–7). We know that Theophrastus wrote a treatise on this topic,¹³ and parts, at least, of the sequence in *On Marvellous Things Heard* can be shown to be linked with it. Snakes and lizards cast off their skins when they have finished hibernating; a reference to the gecko's shedding of its skin would be in place in a treatise on hibernation, and it may have prompted a reference to the supposed use of the skin against epilepsy as well.

Flashar indeed warns against the dangers of assuming that a sequence of apparently related items in *Mir. ausc.* all come from the same source,¹⁴ and argues that *Mir. ausc.* 63a and 65 come from *On Creatures that Hibernate*, 63b from the extant *On Fish on Dry Land* (section 8), 64 from *On the Character and Intelligence of Living Creatures*, 66 from *On Creatures said to be Grudging*, and 67 from *On Smells*.¹⁵ But it may be that he has carried caution too far; as he recognises, it is equally likely that the topic of 67 (the fat of hibernating bears) was discussed in *On Creatures that Hibernate* as well as in *On Smells*—especially since it is clear that Theophrastus *somewhere* said more on this topic than is found in *On Smells*. For while some, but not all, of what is attributed to Theophrastus on this topic by Pliny 8.128 is indeed found in *On Smells* 63, and another part of it in Aristotle (?) *Hist. anim.* 8.17 600a8-9, neither text contains a reference to a further point attributed to Theophrastus by Pliny, the lack of blood in hibernating bears. This then may well have come from *On Creatures that Hibernate*, whether we are to suppose that all the points cited in the Pliny passage were found there too or that Pliny has combined material from different Theophrastean sources.¹⁶ The reference in *Mir. ausc.* 63b to fish not having feeling till they are cooked does indeed correspond to *On Fish* 8, but the additional information in the latter that the fish in question are frozen makes it clear that the observation would be even *more* in place in a treatise on hibernation. (This involves supposing, of course, that the compiler of *Mir. ausc.* omitted any explicit reference to hibernation in this instance, perhaps supposing it to be clear from the context.)

It is of course still possible that the gecko's shedding of its skin was mentioned in *On Creatures that Hibernate*, but no more than that, and that the

reference to the supposed medical effects was added by the compiler of *Mir. ausc.* from his knowledge of other Theophrastean works. However, the story does not stop here. Pliny, *Nat. hist.* 8.111, in the middle of a context concerned with grudging creatures, and prompted by a reference to the skin of the gecko, inserts a claim (introduced by "they say") that the bite of the gecko is poisonous in Greece but not in Sicily. One is tempted to think of Theophrastus' work *On Differences according to Place*. But even more oddly, the same point about the gecko (with the localities reversed) is made in [Aristotle] *Mir. ausc.* (148) in a sequence (139–151) concerned with creatures that bite and sting—on which topic Theophrastus *also* wrote a treatise.¹⁷

In cases like these, indeed, it is unclear how far we have to do with repetition of a similar point by Theophrastus in different contexts, and how far with the effects of the methods of compilation adopted by Pliny and by the compiler of *Mir. ausc.* Clearly *sometimes* it is a case of a secondary source bringing together references to the same creature in different Theophrastean works, as Athenaeus does explicitly in the passage on the octopus from which we started¹⁸ or in his discussion of the electric ray.¹⁹ Equally clearly it is sometimes a case of Theophrastus mentioning the same topic in more than one treatise.

Aelian, *De nat. anim.* 3.32–8, mentions Theophrastus four times in a context that contains two more unattributed parallels with points that we know from other sources were made by him.²⁰ It seems plausible to suppose, from its subject matter, that most of this material is linked with Theophrastus' zoological treatise *On Differences according to Place*.²¹ But the passage also contains a reference to the effect of Nile water in promoting fertility; no source is given by Aelian, but we know from Athenaeus that Theophrastus made this point in his treatise *On Waters*.²² And Aelian also introduces—somewhat out of context—a contrast between creatures that bite and those that sting;²³ again, no source is given, but one naturally thinks, where this topic is concerned, of Theophrastus' treatise *On Creatures that Bite and Sting*.²⁴ The promotion of fertility by Nile water may well have been discussed by Theophrastus both in *On Differences according to Place* and in *On Waters*, for the point would be in place in both; Aelian indeed introduces it in explanation of the exceptional fertility of goats in Egypt (compare the preceding reference to the exceptional milk production of goats on Scyros). The allusion to *On Creatures that Bite and Sting*, however, may be due to Aelian himself, or to his probable secondary source.²⁵

At *Natural History* 36.134 Pliny cites Theophrastus for the assertions that some stones give birth to other stones, that bones are produced from the earth, and that stones, like bones, are found. A reference to stones giving birth to others appears at *On Stones* 5,²⁶ and there is a reference to fossil ivory at *On Stones* 37.²⁷ But it seems likely that the discussion of fossils that Pliny

apparently has in mind came not from *On Stones* at all, but from another treatise by Theophrastus *On Things Turned to Stone* (*Peri ton apolithoumenon*).²⁸ Whether Pliny's reference to stones giving birth to others, too, came from there or from the extant *On Stones* is perhaps less certain; it might not seem particularly in place in *On Things Turned to Stone*, but Theophrastus did often repeat statements in more than one work.²⁹

Eichholz discusses this passage while arguing that the treatise *On Stones* as we have it substantially complete, and that there are no secondary references that suggest major omissions from our text.³⁰ Two other citations may perhaps be mentioned here. One is by Seneca, who at *Natural Questions* 3.25.7–8 refers to light stones like pumice, and adds “the islands made of these in Lydia float, as Theophrastus says.”³¹ The reference probably comes not from *On Stones*, but from a lost work *On Waters*.³² It may be noted, however, that Theophrastus *does* discuss the *formation* of pumice stone at *On Stones* 19,³³ though without any reference to these floating islands.

The second passage is in Solinus, *Collection of Marvels* 15.23, where Theophrastus is cited as saying that the emerald occupies the third rank among precious stones.³⁴ I have not succeeded in relating this to any passage of *On Stones*, nor is it clear to what other work by Theophrastus it might relate.

In *On Winds* 5, Theophrastus refers to the production of rain as a result of the compression of clouds against mountains by the wind. Proclus, commenting on Plato's *Timaeus*, cites Theophrastus for this point,³⁵ but does so after mentioning specifically the theory that the Nile floods were caused by rain produced in this way in the mountains of Ethiopia;³⁶ and Olympiodorus, commenting on Aristotle's *Meteorologica*, expressly cites Theophrastus for the latter point too.³⁷ The general theory that rain is produced by the compression of clouds appears in Theophrastus' *Meteorology*,³⁸ but without any reference to mountains in general or to the Nile in particular. It seems probable that this is due to compression in the versions of the *Meteorology* that we have; if it is that work that is the source of Olympiodorus' information, his citation suggests that the specific example of the Ethiopian mountains was coupled there by Theophrastus with other examples, one of which (condensation in vapour baths) survives in the extant versions of the *Meteorology*.³⁹ But it does also seem likely that Theophrastus discussed the flooding of the Nile, and perhaps of other rivers too, in another treatise. In Seneca, *Natural Questions* 3.26.1, a reference to the Nile, with no authority explicitly mentioned, is followed by a citation of Theophrastus as saying that rivers in Pontus, too, rise in the summer;⁴⁰ and the reference in *On Winds* 5 from which we started is followed by an apparent cross reference to Theophrastus' treatise *On Waters*. So it may be that Theophrastus had more to say about the flooding of rivers than was ever contained in the *Meteorology*, and that the treatise *On Waters* was where he

discussed the point.⁴¹ Certainly the qualities of Nile water in other respects were more than once mentioned in that treatise.⁴²

II

A further complication arises from the fact that it is not always obvious whether a citation is from a genuine work by Theophrastus. There was after all considerable doubt in antiquity over attributing certain works to Aristotle or to his younger associate.⁴³ When scholars were concerned with locating and arranging Peripatetic material to cover specific aspects of physical science, the question from *which* Peripatetic a particular treatise came, though not without importance, was secondary.⁴⁴ This attitude can be found as late as the Renaissance, too, as Dr. Schmitt has emphasised.⁴⁵

Theophrastus' treatise *On Winds* is not for the most part concerned with cataloging the names of particular winds, but rather with the general theory of their production and behaviour. However, there is a short concluding section that does list some names for winds, and it contains information that is to be found in much greater detail in the treatise *On the Positions and Names of Winds* attributed to Aristotle. Steinmetz argues that this material originally came *not* from Theophrastus' treatise *On Winds*, but from his *original* treatise *On Weather-Signs* (now lost, the treatise of that title which we now possess being spurious).⁴⁶ From the original *On Weather-Signs*, Steinmetz argues, the material was incorporated into [Aristotle] *On the Positions of Winds*; and from there short excerpts were added to *On Winds*.⁴⁷ The pseudo-Aristotle work is subtitled 'From Aristotle's "*On Weather-Signs*";' doubt as to whether a particular work was by Aristotle or by Theophrastus was, as mentioned, not uncommon.

The situation is further complicated, however, by the fact that Alexander of Aphrodisias, in his commentary on Aristotle's *Meteorology*, cites some of this material on the names of winds, attributing it to Theophrastus. First, he cites Theophrastus for the statement that the Sicilians call the East wind (*Apeliotes*) the *Hellespontias*, the wind from the Hellespont. This seems *prima facie* exceedingly unlikely.⁴⁸ The actual text of Theophrastus' *De ventis*, as we have it, runs as follows (I have numbered the sentences for ease of reference; additions in <brackets> are Schneider's):

(1) In Sicily they do not call (the East-North-East wind⁴⁹) Caecias, but Apeliotes; some people think it is not the same, but different, because the one makes the sky cloudy and the other does not. . . . (lacuna). . . . (2) The Argestes (the West-North-West wind⁵⁰) . . . (lacuna) . . . some call Olympias, some Sciron,⁵¹ <but> those around Sicily call it Circias.⁵² (3) The Apeliotes Hellespontias, but the Phoenicians (call it) Carbas,⁵³ and <those> in Pontus Berycyn-tias.⁵⁴

It is *possible* to punctuate this, as Wimmer does and as I have above, by putting a heavy stop between (2) and (3), so that the reference to the Hellespontias is not attributed to the Sicilians; but the use of the name Hellespontias is then left entirely unattributed to any particular region. It is far more likely, as Kaibel saw, that something has dropped out of the text;⁵⁵ [Aristotle] *On the Positions of Winds* says of the Apeliotes that it is called Hellespontias in Proconnesus, Teos, Crete, Euboea, and Cyrene.⁵⁶ But in any case, it follows, as Kaibel also pointed out, that Alexander was using the text of *On Winds* already in the state in which we now have it, simply making explicit the interpretation of the text as referring to the Sicilians, which the text as it stands already implies.⁵⁷

There is, however, a problem. Shortly afterwards Alexander mentions a series of names for Argestes, the West-North-West wind.⁵⁸ Two of them, Olympias and Sciron, are to be found as names for Argestes in Theophrastus' *On Winds* (above) and in Aristotle's *Meteorologica*.⁵⁹ On the other hand, the wind Iapyx, for which Alexander *explicitly* cites Theophrastus, is *not* mentioned in the latter's *On Winds*, though it is mentioned in [Aristotle] *On the Positions of Winds*.⁶⁰ From this fact alone, the natural inference would be that Alexander is using, not *On Winds* at all, but either [Aristotle] *On the Position of Winds* or perhaps—since he gives Olympias and Sciron as names for the Argestes, not the Thracias—the *genuine On Weather-Signs* of Theophrastus.⁶¹ But then it is difficult to explain his reproduction of the lacuna in the passage of *On Winds* referring to the Hellespontias; and in any case, arguments from the content of Theophrastus' *On Winds* as it stands are suspect, since the text as we have it has apparently suffered losses. The most plausible supposition is that Alexander used Theophrastus' *On Winds*, that the omission relating to the Hellespontias occurred before the text Alexander used was written, and that a reference to Iapyx survived long enough for Alexander to incorporate it but dropped out afterwards.⁶² But it may be that the textual tradition of all this material was much more complicated than so far supposed.⁶³

Mention of *On Weather-Signs* prompts reference to two other problematic references to that treatise. At *Natural Questions* 7.28.3, Seneca, referring to a comet that appeared in 60 A. D., says that the effects foretold by Theophrastus and Aristotle occurred, namely storm and *earthquakes*.⁶⁴ In fact it is storm, or rather wind, and *drought* that both Aristotle⁶⁵ and pseudo-Theophrastus, *On (Weather)-Signs*,⁶⁶ mention as the effects of comets; Aristotle does mention an earthquake in his discussion of comets at *Meteorology* 1.6 343b2–4, but apparently only in order to indicate the date.⁶⁷

Secondly, Proclus explicitly cites Theophrastus' treatise *On Weather-Signs* for the information that the Chaldeans in his time foretold from the heavenly bodies not just storms and fair weather, but the courses of individuals' lives and their deaths.⁶⁸ The extant treatise *On (Weather)-Signs* does mention

Mercury as foretelling cold in winter and heat in summer,⁶⁹ but contains no reference to the Chaldeans or to the foretelling of the fortunes of *individuals*. To suppose that Proclus is referring to the original, genuine treatise *On Weather-Signs* raises the question of the date at which the genuine treatise was lost. It would also involve a very early date for this reference to astrology.⁷⁰

III

It would be tedious to give a long series of examples of the types of reworking, modification, and sometimes misunderstanding of Theophrastean material that we find in citations of works that survive, and that doubtless also are present in cases where we do not have the original text as a check. One passage may perhaps serve as an illustration.⁷¹ At *On Fish* 9, Theophrastus refers to the *kentriskos* fish, which develops underground in the region of Heracleia,⁷² and then (section 10) he mentions fish that come out of the sea onto the land to look for food. Pliny (9.177) wrongly combines these two types,⁷³ and also refers to the fish walking on their gills to seek food and to the maturing of tortoises' eggs. Theophrastus here simply mentions the *narrowness* of the gills to prove that the fish in question can survive out of the water, because they do not need much cooling: but in section 2 (reported by Pliny just before at 9.175) he has mentioned fish in the region of Babylon that search for food by walking on their gills,⁷⁴ and Pliny has correctly identified the present passage as a reference back to this. The comparison with tortoises' eggs, however, seems to be Pliny's own. At 9.178, citing section 11 of *On Fish*, Pliny adds a comparison with wells that is not to be found in the text of Theophrastus, and then ridicules the alleged implication that fish might be found in wells.⁷⁵

IV

In considering the survival of knowledge of Theophrastus' works into the Middle Ages, a distinction needs to be drawn between actual knowledge of the text of a work on the one hand, and second- or third hand citations or mere awareness that it had once existed and of the general nature of its contents on the other. (I have already discussed one instance of indirect transmission elsewhere, in the material from *On Fish* cited by Albertus Magnus from Pliny via Thomas of Cantimpré.)⁷⁶

The textual tradition of the *opuscula* has been definitively analysed by Walter Burnikel.⁷⁷ For the present purpose, it may suffice to point out that there are four main groups of manuscripts, one containing just the *Metaphysics*—in association with Aristotle's treatise—one containing only the treatise *On Fire*, a third containing excerpts from the latter work, and a fourth group, which is our main concern here, containing *On Fire*, the *Metaphysics*, *On Stones*, *On*

Sweat,⁷⁸ *On Giddiness*, *On Tiredness*, *On Fish*,⁷⁹ *On Winds*, and *On Smells*.⁸⁰ Some treatises, notably *On Sweat* and *On Tiredness*, are split in some of the manuscripts into sections that have become disarranged; two manuscripts lack *On Fish* and *On Winds*, and one has *On Fire*, *On Winds*, and *On Stones* only.

There are four main late classical or early medieval indications of knowledge of the *opuscula*.⁸¹ One is the list of Theophrastus' works given in the short life in the *Suda*.⁸² This list seems to have been compiled by someone who was in a hurry and whose interest was limited. It begins with a list of five logical works in alphabetical order, all beginning with the letter A, and clearly taken from the first catalog of Theophrastus' works in Diogenes Laertius' account;⁸³ but after these, reference is simply made to *On Stones*, *On Plants*—that is, the *Enquiry into Plants*⁸⁴—*On Metals* and *On Odours*. Of these, all but *On Metals* survive; that was the companion piece to *On Stones*, and it is referred to at the start of the latter. It is more than once mentioned by Aristotelian commentators as part of the Peripatetic corpus of works on natural science, with some uncertainty as to whether it was by Theophrastus or by Aristotle,⁸⁵ and that too would make it familiar. The date of its disappearance is uncertain; it is quoted by name by Pollux (second century A. D.),⁸⁶ Harpocration,⁸⁷ and Hesychius (fifth century),⁸⁸ but references could easily be preserved in the lexicographical tradition even when the full work did not survive. References to the title of the work in the Aristotelian commentators continue until the end of the Middle Ages,⁸⁹ but these too may just be handed down from one commentator to another without implying access to the actual work.

V

The second list is in the prologue to the *Answers for Chosroes* of Priscianus Lydus.⁹⁰ There, reference is made to a *Naturalis historia* and a *Naturalis auditus*, and to works *De somno et somniis*, *De morsibus nocivis*, *De ventis* and *De modis et moribus et habitationibus*. The *De ventis* is the treatise *On winds*, which survives; the *Naturalis auditus* is presumably Theophrastus' *Physics*, now lost,⁹¹ and the *Naturalis historia*, being distinct from it, may perhaps be the doxographical work.⁹² The other three treatises are all lost, though they can be related to the list of titles in Diogenes Laertius' life of Theophrastus and to other references.⁹³ *De morsibus nocivis*, the full title of which was *On Creatures that Bite and Sting*,⁹⁴ was one of a group of seven treatises on living creatures that form a group in the first section of Diogenes' catalog.⁹⁵ *De modis et moribus et habitationibus* is naturally connected with a title in the *third* section of Diogenes' list of Theophrastus' works, *On the Intelligence and Character of Living Creatures*—⁹⁶especially as the word translated "character," *ēthos*, can also have the sense of "habitat".⁹⁷ There is however a further problem here, with regard to the relation between this work and one reported by Athenaeus, *On*

Differences according to Place.⁹⁸ One might suspect that *On the Intelligence and Character of Living Creatures* was a compendious title covering more than one of the separate zoological treatises known to us from elsewhere; the theme of animal intelligence might be thought relevant to several of them.⁹⁹ On the other hand, the fact that it seems possible to link a *distinct* section of [Aristotle] *Mir. ausc.*—1–15, or at least parts thereof—with *On the Intelligence and Character of Living Creatures* suggests that the latter was a work different from any of the group of seven zoological treatises;¹⁰⁰ and Priscian's citation strongly suggests that *De modis et moribus et habitationibus* was for him a work distinct from *On Creatures that Bite and Sting*. The fact that *On the Intelligence and Character of Living Creatures* comprised only one book, according to Diogenes Laertius, at least makes it unlikely that it was a general title for the *whole* set of seven zoological treatises. Certainty in these matters is perhaps impossible; we simply do not have enough material to go on.

Of the seven zoological treatises listed as a group by Diogenes, one, *On Fish*, survives in manuscripts; three others, *On Creatures that Change Colour*, *On Creatures that Appear in Swarms*, and *On Creatures said to be Jealous*, are summarised by Photius (below, section VII). The other treatises, *On Creatures that Bite and Sting*, *On Differences of Sound between Creatures of the Same Kind*, and *On Creatures that Hibernate*,¹⁰¹ survive only in secondary citations.¹⁰² What is interesting is that there is—in terms of titles, anyway—no overlap between the treatises mentioned by Priscian and those summarized by Photius.

VI

This is the more interesting in the light of our third source, which is a rather strange one. A group of four poems on alchemy includes one placed in the mouth of Theophrastus.¹⁰³ The others are attributed to Heliodorus, Hierotheus, and Archelaus. On the grounds of similarities between the poems, Reitzenstein concluded that Heliodorus was actually the author of all four poems, which he dates in the early 8th century A. D.¹⁰⁴ The interesting thing from our point of view is that the supposed Theophrastus, in the prologue to his poem, gives an account of his achievements, and that this may, as Reitzenstein suggests, constitute evidence for the author's knowledge of Theophrastus' interests, whether or not we are to suppose that he had any direct or detailed knowledge of the contents of particular Theophrastean works as opposed to their titles.¹⁰⁵

A distinction needs to be drawn between the first and the second parts of this account. The first part, from line 22 to line 44, is concerned with astronomical knowledge (lines 22–34) and with medical matters (lines 35–44). Reitzenstein argued, on the basis of verbal parallels between what is

attributed to "Theophrastus" here and the chapter headings of Aetius' *Placita* (the parallels were pointed out by Boll) that Heliodorus' knowledge rested, indirectly, on Theophrastus' *Opinions of the Philosophers*.¹⁰⁶ One might also think of references to Theophrastus' views on astronomy in Simplicius,¹⁰⁷ and, where medicine is concerned, of the physiological works cited by Photius and in some cases surviving in manuscript as well,¹⁰⁸ of the pharmacological material in the ninth book of the *Enquiry concerning Plants*,¹⁰⁹ and of the frequency with which Theophrastus is cited by Galen;¹¹⁰ after all, medicine is hardly a central concern of the *Placita*, and Reitzenstein can point to only two sections in support of his case (5.29, 5.30). But in fact it seems more likely that Heliodorus' terminology reflects contemporary alchemical literature.¹¹¹ The passage could still be evidence for the sort of topic with which Theophrastus might be associated, but little more; and any specific connection with the chapter headings of the *Placita* seems more than doubtful. As Dr. Obbink points out to me, the *Placita* consists of lists of conflicting opinions, which is a rather different matter from our author's (typically alchemical) claim to certain knowledge.

I would like to quote the rest of the summary of "Theophrastus' " achievements in full: I have inserted some line numbers in brackets to aid reference.

(45) And it is not only these things that we know, being wise, even though they are very great wonders: (47) but, again, we have laid down an account in writing so as to state accurately the plants on which flowers grow and their mixtures and type and also taste, and the whole family of juices and plants that occur by nature in dry ground, so that (men shall have) knowledge of an accurate account. (51) And we know well the colours, types and places of precious stones, and the benefits and also the harmful effects of metals where they occur. (55) And we know the creatures of the sea, of all types and shapes, their forms and how to bring benefit from these to mortals, and how to escape their harmful effects and not be caught unawares; (59) and we know the varied forms of winged kinds, with differing voices and strangers to one another in form,¹¹² which are of benefit to human kind and have their existence to bring enjoyment to life. (63) And so too we have set forth in words every beast and every species and genus of reptile.

The references in 45–51 could be connected with the botanical works; note the particular emphasis on tastes and juices, in view of the subject matter of the sixth book of the *Explanations of Plants*.¹¹³ Lines 52 and 53 recall the familiar pair *On Stones* and *On Metals*, but the reference to benefits and harmful effects reflects our author's alchemical and magical preoccupations rather than anything we know of in Theophrastus' works. The reference in 55 to sea-creatures with beneficial and harmful effects could be related, at least in part, to Theophrastus' work *On Creatures that Bite and Sting*: one of the surviving references to this does relate to the electric ray.¹¹⁴ And the reference to birds in 59, if Mrs. Huby's emendation is correct,¹¹⁵ recalls the work *On*

Difference in Sound between Creatures of the same Kind. At least one citation of this relates precisely to differences in the sounds of birds.¹¹⁶

Too much should not be built on these possible connections. Heliodorus has clearly been influenced by the sequence sea-creatures—birds—beasts and reptiles, in addition to any more specific information he may have had about particular Theophrastean writings. Moreover, here, as in the earlier section of the preface, the most we can detect in Heliodorus' references is some awareness of the subjects about which Theophrastus wrote and *perhaps* also of specific titles. The emphasis on secret knowledge,¹¹⁷ and also that on the practical utility of knowing the beneficial and harmful effects of various creatures,¹¹⁸ derive from the alchemical tradition and not from Theophrastus; and the claims that Heliodorus represents Theophrastus as making should certainly not be regarded as reproducing original Theophrastean claims.

Given the uncertainty of linking references to "Theophrastus" here to specific titles of works by the real Theophrastus, too much should not perhaps be made of the fact that *On Creatures that Bite and Sting* appears in Priscian's list and that another of his titles may be linked with *On Differences according to Place*.¹¹⁹ It is, however, striking that there does not seem to be much correspondence, here either, with the group of works excerpted by Photius. Indeed, two of the treatises that *are* summarized by Photius, *On Creatures that appear in Swarms* and *On Creatures said to be Grudging*, might seem to have rather more to do with benefits and detriment to mankind than *On Difference of Voice*, at least in spite of Heliodorus' reference to the entertainment of mankind by birds.

VII

In section 278 of his *Library*, Photius summarizes nine minor treatises of Theophrastus. They are an odd and varied collection, and the order in which Photius gives them is even odder; he *might* have read what he found in one manuscript and then gone on to record similar items when he found them in others, but this would suggest a strangely chaotic manuscript tradition. There is no sign of alphabetical ordering having played any part, and the order of the treatises in Photius bears no relation to that in any of our surviving manuscripts.¹²⁰

The works summarized by Photius are: 1. *On Creatures that Change Colour*, 2. *On Paralysis*, 3. *On Fainting*, 4. *On Giddiness*, 5. *On Tiredness*, 6. *On Creatures that appear in Swarms*, 7. *On Creatures that are said to be Grudging*, 8. *On Sweat*, and 9. *On Honey*. Of these 1, 6, and 7 form part of the group of seven treatises of living creatures mentioned earlier;¹²¹ none of these survive in manuscript, but *On Fish*, which *does*, is not among the works summarised by Photius. Of the remaining six works summarised, three—4, 5 and 8—survive

in manuscript while the other three, namely 2, 3, and 9 do not. Two, 3, 4, and 5 do form a coherent physiological group, but 8 is detached from them.

Burnikel has shown, in the case of those works that also survive in manuscript, that the key to Photius' approach as an epitomator is that, in effect, he treats Theophrastus' works as collections of problems—as the compiler of the collection of problems attributed to Aristotle had already done—and picks and chooses which “problems” to cite, ignoring more theoretical discussions.¹²² This means that, in general, he tends to concentrate on the later sections of works rather than on the earlier, more theoretical ones, like the opening section of *On Tiredness*. This said, however, his procedure thereafter varies from one treatise to another. In the case of *On Tiredness*, which has 18 sections in Wimmer's edition, Photius does not begin his summary until section 11; parallels to this work in the pseudo-Aristotle *Problems*, similarly, do not start until section 9. Thereafter Photius records section 11 and the first part of 12, and the first parts of sections 13, 15, 16, and 18: that is to say, he is pretty consistent in the amount of material he includes, giving more or less the same amount of recognition to each part of Theophrastus' discussion.

In the case of *On Giddiness*, which has 12 sections, Photius summarizes much of sections 1 and 2, the end of 3, and the beginning of 4, and then copies out the whole of the second half of the treatise, from the beginning of section 6, with the exception of a few sentences. The summary of *On Giddiness* is much longer, in proportion to the original work, than either that of *On Tiredness* or that of *On Sweat*, which is a much longer work with 40 sections in Wimmer's edition. Here Photius records the beginning of section 2, and summarizes the end of 4 and the beginning of 5. He then jumps to section 18, skipping the more theoretical part of the discussion as in the case of *On Tiredness*, deals in great detail with 18–22 (on the relation of sweat-odour to youth, digestion, and exercise), which are more easily reduced to “problem” form, jumps to 25, and proceeds from there to the end in much the same manner, though rather more briefly.

In the case of *On Creatures said to be Grudging*, it seems clear that Photius' summary has preserved the structure of the original treatise, first listing examples of alleged grudgingness on the part of animals and then suggesting alternative explanations.¹²³ He has however been selective, for it is clear from other sources that the alleged phenomenon of “horncast seeds”—seeds that strike the horns of the ploughing ox and were thought to become infertile—was discussed in *On Creatures said to be Grudging*, though Photius does not record the fact. It was apparently given toward the end of the treatise as an example of a phenomenon that had a natural explanation, though an obscure one, the suggestion being that the behavior of other animals, which seemed to be due to their grudgingness, in a similar way had some obscure natural

explanation.¹²⁴ However, the parallel is hardly exact; the ox does not seem actually to *do* anything like the other creatures, being an entirely passive contributor to the process that renders the seeds infertile, and so the question of spite could hardly arise. It also seems that Theophrastus said more about the octopus in *On Creasures that Change Colour* than is preserved in Photius' summary.¹²⁵

VIII

The extent to which Theophrastus seems to have brought topics from one context into the discussion of another,¹²⁶ and to have discussed them not only in those works where the title might lead us to expect it, but also elsewhere, may partly be a result of his inclination, following Aristotle, to see the natural world as *in principle* the object of a single, unified enquiry.¹²⁷ It does not I think conflict with this that, as Gottschalk has argued, where detailed enquiries are concerned, Theophrastus more than Aristotle concentrates on the particular point at issue rather than the general theory,¹²⁸ or that he is perhaps more ready than Aristotle to recognise that the same principles may not apply everywhere.¹²⁹ For we may well try to look for consistent and harmonious explanations even while recognising that this may not always be possible. The essence of the Peripatetic genre of "problem" literature is precisely to try to resolve particular questions in terms of a general framework; and it is no accident that both ancient compilers and later Photius were able to use Theophrastus' works as a quarry for "problems."

Nevertheless, it is necessary to remember that the picture is complicated by secondary sources taking Theophrastean material—often, probably, through one or more intermediaries—and reorganising it, usually with material from other sources, on different principles. This introduces a further complication into attempts to reconstruct those works by Theophrastus that we do not now possess.

NOTES

1. This is a revised and abridged version of a paper read at the 1985 London conference of Project Theophrastus. I am grateful to all who were present and participated in the discussion, and especially to Dr Hans Daiber, Dr Dirk Obbink, and the late Dr Charles Schmitt, the commentator on the paper. Dr Schmitt contributed greatly to Theophrastean studies, for example by his article on Theophrastus in the *Catalogus Translationum* (ed. P. O. Kristeller: vol. 2, Washington D.C., 1971, 239–322) and by his survey 'Theophrastus in the Middle Ages', *Viator* 2 (1971) 251–70. I personally experienced his willingness to help with the most obscure queries, and I would like to dedicate the present paper to his memory.
2. Attention here will be concentrated on works in the physical or biological areas; I

will not be saying anything about the *De sensibus* (which has a distinct manuscript transmission) or the *Metaphysics*. Theophrastus' zoological works have been included, even though they do not all survive; one, *On Fish*, survives in manuscript, and another three are summarized by Photius. The issues that occur in the discussion of these works and of the surviving *opuscula* throw a certain amount of light on each other.

It will be obvious how much I owe to the secondary literature, and especially to O. Regenbogen, art. 'Theophrast', *RE* suppl. 7 (1950) 1354–1562, and P. Steinmetz, *Die Physik des Theophrast*, Bad Homburg 1964. I am also greatly indebted to a paper by Pamela Huby, 'Theophrastus in the Aristotelian corpus, with particular reference to biological problems', in *Aristotle on Nature and Living Things: Philosophical and Historical Studies presented to D. M. Balme*, edited by Allan Gotthelf (Pittsburgh, 1985) 313–325.

3. *De piscibus* 5. The point is made in the context of the relation to air and water and to heat and cold of fish that come onto dry land (below, n.5); that the octopus itself does so, to collect food, has already been claimed at *On Fish* 3. Cf. Aristotle (?), *Hist. an.* 9.37 622a31; also Clearchus fr.102 Wehrli; Oppian, *Halieutica* 4.264–307; Aelian *de nat. anim.* 9.45.
4. 7.104 317F.
5. *On Fish* is the title in the manuscripts; *On Creatures that Spend Time, or Remain, on Dry Land* appears in Diogenes Laertius' list and in Athenaeus 7.90 312B and 7.104 317F, and the MSS text itself begins after the title with "concerning the remaining of those that are on dry land". Cf. M. Sollenberger, "Diogenes Laertius 5.36–57: the Vita Theophrasti", in W. Fortenbaugh, P. Huby and A. Long, eds., *Theophrastus of Eresos: On his life and work (Rutgers University Studies in Classical Humanities, II, 1985)* p. 20. The text that survives in the manuscripts is scarcely a general discussion of fish; it has two themes, fish that come ashore onto dry land and fish generated there. Cf. below, section III. It is difficult to suppose that "On Fish" is a section heading, a sub-division of *On Creatures that Remain on Dry Land* (as suggested by Regenbogen 1427–8); what would the other creatures be concerning which this point required special comment? Perhaps *On Creatures that Remain on Dry Land* was a subdivision of *On Fish*; or perhaps the general title "On Fish", appearing only in the codices and not in any ancient reference, is simply due to some careless scribe or cataloguer. *On Fish* is roughly the same length as *On Giddiness*; the text is damaged at the start, but apart from that it could well be a complete and self-contained discussion of its two particular themes. If the misplaced reference to fish found in stones at *De odoribus* 70 relates to *On Creatures that Remain on Dry Land* it would indeed appear that our text is incomplete; but it may rather belong to *On Things Turned to Stone*. Cf. D. E. Eichholz, *Theophrastus: De lapidibus*, Oxford 1965, 14 n.3.
6. For this cf. *On Fish*, 4, ad init.; Aristotle, *de respiratione* 475b5 ff. More accurately, the octopus does take in sea-water, but only in the course of feeding, not for cooling; Aristotle op. cit. 476b30ff. and *Hist. an.* 8.2 589b20–22. That Athenaeus is right in citing *On difference with regard to locality*, rather than *On creatures that live on dry land*, for the absence of octopus in the Hellespont, and has not just made a simple mistake, is suggested by his reference to the water there being less salty; for this point is not found in the MSS of the extant *On Fish*. On Theophrastus' use of the same material in more than one work cf. also now H. B. Gottschalk, "Prolegomena to an edition of Theophrastus' fragments", in *Aristoteles: Werk und Wirkung*, Paul Moraux gewidmet, ed. J. Wiesner, Berlin 1985, vol. I, 547.

7. Ap. Photius, *Bibliotheca* 278 528b8–10. See below.
8. Photius loc. cit.; cf. Pliny, *Nat. hist.* 17.52–3 and Solinus, *Coll. rer. mir.* 2.38.
9. Photius, *Bibliotheca* 278 528b26–7. Cf. below, n.124.
10. Photius, *Bibliotheca* 278 528b5–7.
11. Theophrastus, *HP* 9.11.3.
12. Apuleius, *Apologia* 51; cf. *On Creatures Said to be Grudging* ap. Photius, *Bibliotheca* 278 528b41–3. For *On Epileptics* cf. Diogenes Laertius 5.43 (there *On Epilepsy*).
13. Below, nn.101–2. *On Creatures that Hibernate* is actually cited for sea-creatures that shed their skins by Athenaeus 3.65 105D. Creatures that hibernate are mentioned in *On Fish*, sections 7, 8 and 9; see below.
14. H. Flashar, *Aristoteles Werke in deutscher Übersetzung*, Bd. 18.2 *Mirabilia*, Darmstadt 1972, 40.
15. Ibid. 98–100.
16. Cf. Regenbogen 1424, 1429.
17. Below, n.94. Flashar (above, note 14) 141–5 argues that most of the material in *Mir. ausc.* 139–51 comes from Theophrastus, but not 149–50.
18. 7.104 317F; in addition to *On Fish* and *On Differences According to Locality* he also there cites *On Creatures that Change Colour* (below, n.124).
19. 7.95 314BC. On the likelihood of intermediary sources cf. Regenbogen 1424.
20. Cf. Athenaeus 9.43 390A and Pliny, *Natural History* 10.79, with Aelian 3.35. Theophrastus is the *only* source cited by name in the whole context in Aelian; however, it seems that Aelian 3.34 is not from Theophrastus, since it refers to Ptolemy II Philadelphus, who did not come to the throne until 283 B. C.
21. Athenaeus, loc. cit. in previous note, actually cites Theophrastus, *On Differences of Sound in Creatures of the Same Kind*; see below, n.98.
22. 2.15 41F.
23. It is followed by a contrast between the Libyan asp, which blinds its prey with its breath, and “the other kind” (i.e. not in Libya?) which does not blind its prey but kills easily. This might indeed have been mentioned in Theophrastus' *On Creatures that Bite and Sting*, but hardly constitutes a contrast between biting and stinging.
24. Below, n.94.
25. On the probability of a secondary source cf. Regenbogen 1424. It is possible, perhaps, that Theophrastus mentioned the peculiar behaviour of the Libyan asp in *On Differences According to Place* and cross-referred to *On Creatures that Bite and Sting*, and that it is Aelian or his source, influenced by the general theme of contrasts and differences in his discussion, who has turned the reference to the title into a contrast between biting and stinging. The matter would be clearer if Aelian's account were not so abbreviated.
26. It is qualified by the statement “if this is true” (*eiper alêthes*); but for Pliny's representation of tentative statements by Theophrastus as categorical assertions cf. G.E.R. Lloyd, *Science, Folklore and Ideology*, Cambridge 1983, 145–6: Pliny 33.113 and Theophrastus, *De lapidibus* 58, Pliny 26.99 and Theophrastus, *Hist. plant.* 9.18.9, 21.44 and *HP* 9.19.2; also above at nn. 8–9. Sometimes, as Lloyd points out, Pliny goes out of his way to represent himself as less credulous than Theophrastus, while actually misrepresenting the latter; elsewhere his omissions of Theophrastus' qualifications may just be due to carelessness.

For stones growing or giving birth one may compare references to quarries, stone or metal, which miraculously filled up (Strabo 5.2.6 and [Aristotle], *Mir. ausc.* 42–4; the latter probably from Theophrastus, *On Metals*, cf. Flashar, above

- n.14, 86–7), and also to special types of stones which gave birth to others—apparently hollow stones with modules inside which rattled and lead to the belief that the stones were pregnant (Pliny, *Natural History* 36.149–151 and 37.180, where these stones are said both to give birth to other stones themselves and to be useful amulets for pregnant women; cf. E.R. Caley and J.F.C. Richards, *Theophrastus On Stones*, Columbus, Ohio 1956, 68–9; Eichholz (above n.5) 91; J. Ruska, *Das Steinbuch des Aristoteles*, Heidelberg 1912, 4–5). More recently in Arabia sounds emitted by certain stones were apparently described as the birth-cries of newly-born stones; H. Petermann, *Reisen in Orient* vol. 2 p.132, cited by Ruska, op. cit., p.5 n.1.
27. K.C. Bailey, *The Elder Pliny's Chapters on Chemical Subjects*, London, 1932, 2.253–4 thinks that the bones from the earth in Pliny 36.134, and the “fossil ivory” of that passage and *De lap.* 37, refer simply to bones and ivory dug up from the ground; however, he recognises that the “stones like bones” in the Pliny passage may be fossils in the proper sense. Cf. Caley-Richards 135; Eichholz 113.
 28. Cf. Eichholz 91; Steinmetz (above n.2) 305–11. The title of the work has been doubted; the MSS of Diogenes Laertius have *aithoumenōn* (B), *lithoumenōn* (FPQCoWV) (cf. M. Sollenberger, above n.5, pp. 17–18), but the work clearly comes among those starting with *a*. Usener suggested *apolelithōmenōn*, Regenbogen *apolithoumenōn*; Sollenberger 47–8 argues for *aithoumenōn* “On Things that Burn” as the correct reading in Diogenes’ list, but allows that Theophrastus may have written a separate treatise on petrification as well. Fossils are mentioned in an Arabic text (F. de Mély, ‘Le lapidaire d’Aristote’, *Revue des Etudes grecques* 7 [1894] p. 188.19 I. Hammer-Jensen, “Das IV. Buch der Meteorologie des Aristoteles”, *Hermes* 50 [1915] p.133.12), which Regenbogen 1418–19 thinks may derive from Theophrastus’ work. Cf. also *De odoribus* 70; above, n.5.
 29. Stones with power to turn other things to stone—which is slightly different from stones giving birth to other stones—are mentioned in Theophrastus’ *De lapidibus* (section 4), but only in passing (cf. Eichholz 91). For things being turned to stone cf. also (Aristotle), *Mir. ausc.* 52, Pliny, *Natural History* 36.131 (citing Mucianus), and de Mély p.187.7. Cf. W. Jaeger, *Diokles von Karystos*, Berlin 1938, 115–16.
 30. Eichholz 14–15.
 31. For these floating islands (not elsewhere described as made of stone) cf. Paradoxographus Florentinus 39, Varro, *De re rustica* 3.17.4, Pliny, *Natural History* 2.209; J. Beaujeu in the Budé edition of Pliny, *Natural History* (vol. 2, Paris 1950) p. 250. Other floating islands (again, not necessarily formed of stone) are mentioned at Theophrastus, *HP* 4.13.4. Floating stones are mentioned at [Aristotle], *De plantis* 2.2 823a42–b18; cf. also [Aristotle], *De causis proprietatum elementorum* 3 (p. 210b11 in *Aristotelis opera cum Averrois commentariis*, Venice 1562–74, repr. Frankfurt-a-M. 1962, vol.7). Cf. E.H.F. Meyer, ed., *Nicolaus Damascenus: De plantis libri duo Aristoteli vulgo adscripti*, Leipzig 1841, 110, and in general C. Fensterbuch, “Schwimmende Ziegel — Schwimmende Inseln”, *Rheinisches Museum* 103 (1960) 373–7.
 32. Steinmetz 265. He thinks that the whole of Seneca, *Nat. quaest.* 3.25.5–7 derives from Theophrastus; *ibid.* 262.
 33. Cf. [Aristotle], *De plantis* 823b11 (above, n.31).
 34. Solinus, *Collectio rerum mirabilium* 15.23, p.97.17–18 Mommsen. The same point is made, without reference to Theophrastus, by Pliny, *Natural History* 37.62, and (from Pliny) by Isidore, *Etymologica* 16.7.1. I am grateful to Mr

- Robert Temple for emphasizing the importance of these other references. According to Eichholz (above n.5) 105 Theophrastus shows no knowledge of the true emerald.
35. Proclus, in *Timaeum* vol.1 p.120.30 Diehl; cf. [Aristotle], *Problems* 26.7 940b33 (rather differently, 26.56 948b15ff.) and Vitruvius 8.2.2 (Theophrastus is mentioned as a source in general terms at 8.3.27).
 36. Ibid. p.120.21; cf. scholion on Plato, *Timaeus* 22e (*Scholium Platonica* p.284.5–9 Greene) and [Aristotle], *Liber de Nilo* fr.248 (p.197.9–11 Rose). "Aristotle" (*Liber de Nilo* loc. cit.) is cited for this point by Philoponus, *In De gen. et. corr.*, *CIAG* 14.2 p.93.13ff.; by Alexander, *In Meteor.*, *CIAG* 3.2 p.53.9ff. (by implication); and by Photius, *Bibliotheca* 249 441b1. See next note; and cf. Olympiodorus, *In Meteor.*, *CIAG* 12.2 94.4ff.; Steinmetz, above n.2, 289ff.
 37. Olympiodorus, *In Meteor.*, *CIAG* 12.2 p.80.30ff. (n.b. *phēsi*, "he says", at 80.34). Olympiodorus contrasts this view with Aristotle's that rain is caused by the cooling of the clouds only (Aristotle, *Meteorologica* 1.9 346b30). The presence of the compression theory in the *Liber de Nilo* therefore suggests that it reflects Theophrastus' views; cf. W. Capelle, "Die Nilschwelle", *Neue Jahrbücher für das klassische Altertum* 33 (1914) 349–50; A. Rehm, art. "Nilschwelle", *RE* 17.1 573; Regenbogen, 1421.
 38. Cf. fol. 352b31–2 of the Syriac version, in E. Wagner and P. Steinmetz, "Die syrische Auszug der Meteorologie des Theophrast", *Abh.Mainz*, Geistes- und Sozialwissenschaft. Kl., 1964, no.1; also H.J. Drossaart Lulofs, "The Syriac translation of Theophrastus' *Meteorology*", in *Autour d'Aristote: recueil d'études . . . offert à Msgr. A. Mansion*, Louvain 1955, 439–43.
 39. Syriac version, 352b32–4 in Wagner-Steinmetz. For compression in the extant versions of the *Meteorology* cf. Drossaart Lulofs 441–3 and Wagner-Steinmetz 51. All three examples are explicitly attributed to Theophrastus by Olympiodorus.
 40. Cf. Steinmetz 287; Capelle (above n.37) 350 n.2.
 41. Regenbogen (above n.2) 1421; Wagner-Steinmetz 51.
 42. Cf. Athenaeus 2.15 41F (Nile water promotes fertility), and compare Aelian, *De nat. anim.* 3.33 (above at n.22); also Athenaeus 2.15 42A (Nile water once poisoned the Egyptians; cf., with the additional point that the water ran salty, Seneca, *Natural quaest.* 4a.2.6, which names Theophrastus, and Pliny, *Natural History* 31.52, which does not).
 43. For doubt about *On Indivisible Lines* cf. Regenbogen 1542–3. A treatise on *Signs of Storms* is attributed to Aristotle by Diogenes Laertius (5.26; see below). See also above, nn.36–7, on the treatise *De Nilo*; and below n.95. The whole question is discussed by Huby in the paper cited in n.2.
 44. Cf. below, n.85, on the treatise *On Metals*; and for the use of Theophrastus in the pseudo-Aristotelian *Problems* cf. Regenbogen 1405–8 and below at n.122.
 45. Cf. C.B. Schnitt, "Aristotelian textual studies at Padua; the case of Francesco Cavalli", in *Scienze e filosofia all' Università di Padova nel quattrocento* (Contributi alla storia dell'Università di Padova 15, 1983) 301 and 309. I am grateful to Dr Schnitt for drawing attention to this issue in the discussion at the conference.
 46. Cf. Regenbogen 1412–13. The treatise *De signis* is not generally found in the same MSS as the other physical *opuscula*; it does occur in some which have the *De igne* alone of these. Cf. W. Burnikel, *Textgeschichtliche Untersuchungen zu neun Opuscula Theophrasts*, Wiesbaden, 1974, xxii–xxxvii.
 47. Steinmetz (above n.2) 353, Anhang II.3. Others are less sure that it was Theophrastus' work that was the source; G. Kaibel, "Antike Windrosen", *Hermes*

- 20 (1885) 606 n.2 suggests only that the source was a treatise written at the time of Theophrastus. Various views are summarised by R. Böker, art. "Winde", RE 2 Reihe 8.2, 2350; cf. also Huby, above, note 2.
48. It may seem almost as surprising that the east wind should be called Hellespontias in Cyrene (below, n.56). Certainly there one would expect such a wind to be *north* of east. Nomenclature was clearly fluid; see below, nn. 49, 51 and 53.
49. Cf. V. Coutant and V.L. Eichenlaub, *Theophrastus On Winds*, Notre Dame 1975, 62, and the following notes. Strictly, if this text follows Aristotle's wind-rose (*Meteorologica* 2.6 363a21ff.), as it apparently does, Caecias will be not the east-north-east wind but the wind thirty degrees north of east, Aristotle's wind-rose having twelve points not sixteen; and similarly in the following examples. Apeliotes, given as a name for Caecias in the first sentence, is normally the east wind; for the converse cf. [Aristotle], *Sit. vent.* 973b1 (some call the Apeliotes, the east wind, the "Theban Caecias").
50. See preceding note. The name Argestes is here a conjecture by Bonaventura; the manuscripts have *parergos*.
51. For these as names for the Argestes cf. Aristotle, *Meteorologica* 2.6 363b24. At [Aristotle], *Sit. vent.* 973b21 Olympias and Scirron (sic) are names for Thracias, the North-North-West wind; this, as A. Rehm, 'Griechische Windrosen', *SB München*, phil.-hist. Kl. 1916 no.3, 99–100 notes, raises a difficulty for the view that Theophrastus, *De ventis* 62 derives from *sit. vent.* (cf. below, n.53). It might be supposed that a reference to the Thracias had dropped out of our text of Theophrastus, as one to the Iapyx may have done (below, at n. 62); the sense might then have been "the Argestes <is called Iapyx. The Thracias> some call Olympias, some Sciron . . .". But Alexander's citation (below, n.58) shows, if he is using the *De ventis* at all, that he had a text in which the reference to Iapyx was still present but in which Olympias and Sciron were already linked with Argestes rather than Thracias. Olympias and Sciron *are* names for the Argestes in Aristotle's *Meteorologica* itself; it is to say the least uncertain whether we should emend the Theophrastus text to make it agree with *Sit. vent.* rather than with this.
52. Kirkian Böker; Kerkian Salmasius; Derkian codd.; *Iapuga* Bonaventura (see below, nn. 59, 62). Circias is a Sicilian name for the Thracias in [Aristotle], *Sit. vent.* 973b20 (cf. above, n.38); it does not appear in Aristotle's *Meteorology*. Cf. Kaibel, loc. cit. in n.47.
53. Cf. [Aristotle], *Sit. vent.* 973b5, where this is a name given in *Cyrene* to the Euris (east-south-east wind) or the Apeliotes, after the Carbanes who *live in* Phoenicia. Rehm, loc. cit., n.51 above.
54. Furlanus; "*berek* . . ." codd. Cf. [Aristotle], *Sit. vent.* 973a24.
55. Kaibel, loc. cit. in n.47. Cf. Rehm, above n.51, p. 100 n.1.
56. [Aristotle], *Sit. vent.* 973a20.
57. This interpretation would be even more natural given the absence of any connecting particle after *apēliōtēn*, where Schneider adds *de*.
58. Alexander, in *Meteor.* 108.30–33.
59. Cf. above, n.51, but contrast *Sit. vent.* 973b21, *ibid.* Neither the correct form of the name Argestes (cf. n.50) nor the reference to Olympias and Sciron as names for it need tell us anything about the text of Theophrastus Alexander had; they are not directly attributed to Theophrastus by him, and could simply come from the text of Aristotle's *Meteorology* on which he is commenting.
60. [Aristotle], *Sit. vent.* 973b14. This text identifies Argestes and Iapyx, *ibid.* 973b17; it does not indicate the localities where either of these names is used

- (Argestes is simply a name "used among many people"). Cf. Rehm, above, n.51 and Steinmetz, above n.2, 353.
61. This may be the suggestion intended by Steinmetz 353–4, though he does not make it explicit. He does not mention the problem of the reference to the Hellespontias at all.
 62. Rehm (above, n.51) makes the suggestion that a reference to Iapyx has fallen out. Cf. above, nn.51, 52.
 63. Schneider (*Theophrasti opera omnia*, vol. 5, Leipzig 1821, 163) suggests that Alexander found a text of Theophrastus' *De ventis* reading "... some Sciron, some Iapyx. The Apeliotes the Sicilians (call) Hellespontias, but the Phoenicians Carbas ...". This is to restore the text on the basis of secondary evidence without having regard to the plausibility of the sense thereby obtained.
 64. At 7.28.2 he cites Aristotle as saying that comets threaten wind and rain, which does not agree with the *Meteorologica* (see next note). P. Oltramare, in the Budé edition of the *Natural Questions* (Paris 1929) 330 n.1, suggests that Seneca has attributed ideas from Posidonius (fr.131a–b Edelstein-Kidd) to Aristotle.
 65. Aristotle, *Meteorologica* 1.7 344b19–26.
 66. [Theophrastus], *De signis* 34. That comets portend cold is claimed at [Theophrastus], *De signis* 57.
 67. 373–2 B. C.
 68. Proclus, in *Platonis Timaeum* vol. 1 p. 151.1–9 Diehl.
 69. *De signis* 46.
 70. Cf. Regenbogen 1414–15; F. Cumont, *Astrology and Religion among the Greeks and Romans*, New York 1912, 53; A. A. Long, 'Astrology: arguments pro and contra', in J. Barnes et al., eds., *Science and Speculation*, Cambridge and Paris 1982, 166 and nn.3–4. As Long following Cumont points out, knowledge that astrology existed need not amount to any great interest in it. Proclus may interpret Theophrastus as praising astrology, but A. Bouché-Leclercq, *L'astrologie grecque*, Paris 1899, 27 and n.2, suggests that as far as *Theophrastus* is concerned praise of those who could predict heat in summer and cold in winter is likely to have been ironical.
 71. Other notable examples may just be mentioned; for rearrangement of Theophrastean material and changes of emphasis, one may compare Pliny 33.113 with Theophrastus *De lapidibus* 58–9, where Pliny's modification of Theophrastus' statement that cinnabar-bearing sand is *only* found in the region of Ephesus may perhaps reflect his being better informed. For misunderstanding, one may compare Pliny 37.65 with *De lapidibus* 35 (cf. Eichholz, 112), Antigonos, *Coll. rer. mir.* 168 with *De lapidibus* 12–13, and Athenaeus 2.74 67b with *De odoribus* 15. (In the last two cases the error results from conflation of separate statements by Theophrastus; in the case of Athenaeus this compression may be due to the epitomator of Athenaeus' books 1 and 2 rather than to Athenaeus himself.)
 72. Unidentified.
 73. *circa eandem Heracleam Lyco amne decedente ovis relictis in limo generari pisces qui ad pabula petenda palpitent exiguis branchiis*. Theophrastus' argument expressly *distinguishes* the two types of fish; the ability to remain in air is possessed *not* by the fish that are generated underground, but by those that go ashore to seek their food. Nor is it clear that the reference to *eggs* represents Theophrastus accurately. At the end of section 8 he refers to the river water leaving behind, in some places eggs, but in others principles (*archai*) from which generation takes place. He then seems to explain the latter by reference to spontaneous generation ("not from

- living creatures”), and to relate the *kentriskos* to this; though the text seems faulty (Furlanus supplied *sponte* in the second clause of section 9).
74. This passage is also echoed in [Aristotle], *Mir. ausc.* 72, and (from Pliny, via Thomas of Cantimpré), by Albertus Magnus, *De animalibus* 24.22 (p. 1522.11–16 Stadler).
 75. Cf. above, at n.26.
 76. R. W. Sharples, “Some medieval and Renaissance citations of Theophrastus”, *Journal of the Warburg and Courtauld Institutes* 47 (1984) 186–7 and n.5.
 77. Burnikel, above n.46.
 78. Strictly *On Sweats*; but that is hardly natural English.
 79. See above, n.5.
 80. On the MSS cf. especially Burnikel, above n.46, xxii–xxvii.
 81. Jerome, *Adversus Iovinianum* 2.6, PL 23 293A (360B), refers to Theophrastus as a writer on plants and animals; this reference is picked up by Dionysius Cartusianus, vol. 9 p. 156.i.C; cf. id. vol. 7 p. 495.ii.C. Cf. also below, n.113.
 82. Suda, s. v. Theophrastus, no. 199, vol. 2 p. 701.31–4 Adler.
 83. Diogenes Laertius 5.42–6.
 84. So called by (e.g.) Alexander, *In De sensu*, *CIAG* 3.1 p. 87.11; Athenaeus 2.15 41F, 3.2 72C, 3.12 77E, (but Athenaeus often has the full title *Peri phutōn historia*: 1.57 31E, 3.11 77A, 3.24 82E, etc.); Galen, *De aliment. fac.* 1.13.11 (*CMG* vol. 5.4.2 p. 237.21ff.); Harpocration, s. v. *melinē* (vol. 1 p. 202.5 Dindorf) and *holoschoinōi* (ibid. p. 221.14). For further references see Sollenberger (above n.5) 26 and 28 (26 and 27 are transposed).
 85. The passages which name Theophrastus as the author (Alexander, *In Meteor.*, *CIAG* 3.2 p. 178.10–15, Olympiodorus, *In Meteor.*, *CIAG* 12.2 p. 266.33–6, and Gennadius, *In Meteor.*, vol. 7 p. 481.16–20 ed. Petit, Siderides and Jugie) all relate to the end of Aristotle, *Meteorologica* 3; those that name Aristotle (Olympiodorus, *In Meteor.*, *CIAG* 12.2 p. 6.2, Philoponus, *In de Gen. et Corr.*, *CIAG* 14.2 p. 2.16, and Philoponus, *In Phys.*, *CIAG* 16 p. 1.26; also, by implication, Simplicius, *In De caelo*, *CIAG* 7 p. 2.32) or are uncertain (*Simplicius In Phys.*, *CIAG* 9 p. 3.1, where the Aldine ed. has “he [i.e., in context, Aristotle] says”, but MSS D and F have “they [i.e., Aristotle and Theophrastus; cf. V. Rose, *Aristoteles Pseudepigraphus*, 261] say”; cf. p. 3.10) are from general surveys of the contents of the Aristotelian corpus relating to natural science. (That a single author, as in the case of Olympiodorus, can give two different attributions in two types of context shows the extent to which the Aristotelian commentators followed tradition.) In general cf. R. Halleux, *Le problème des métaux dans la science antique*, Paris 1974, 171–7 (*Bibl. fac. philos. de Liège*, 209); Sollenberger, above n.5, 22 and 24.
 86. Pollux, *Onomasticon* 7.99 (attributing it to “Aristotle or Theophrastus”) and 10.149, attributing it to Theophrastus.
 87. Harpocration, s. v. *kenchreōn* (vol. 1 p. 172.15 Dindorf), naming Theophrastus as author.
 88. Hesychius, s. v. *prospanē* (no. 3120, vol. 3 p. 392 Schmidt, with Theophrastus as author) and s. v. *skarpōn* (no. 874, vol. 4 p. 40 Schmidt) and *suzōsma* (no. 2212, vol. 4 p. 92 Schmidt), with no author named.
 89. Gennadius (above n.85) died in 1468. Albertus Magnus, *Meteorologica* 3.5 (vol. 4 p. 703a) has a general reference to *scientia mineralium*, but not specifically to Theophrastus or to a book title. Burnikel, above n. 46, 156–69, argues that a passage preserved in cod. Bern. graec. 402 is a fragment of the *De metallis*; but Huby pointed out to me that the presence of hiatus in the passage is an argument against its being Theophrastus’ work.

90. *Supplementum Aristotelicum* 1.2, ed. I. Bywater, Berlin 1886, p. 42.3–7.
91. Although some of the surviving opuscula may have constituted sections of it; cf. Steinmetz, above n.2, 9–13. One may compare the full title of Aristotle's *Physics*, *Phusikē akroasis*.
92. The title *Phusikē historia* occurs at Simplicius, *In Phys.*, *CLAG* 9 p. 115.11 and 154.17, and by implication at p. 150.1. (Steinmetz p. 348 also sees a reference to the book title at *ibid.* p. 22.29, but cf. *contra* Gottschalk at *Gnomon* 39 [1967] 18 n.1). Steinmetz argues that the *Phusikē historia* was the *physics* itself rather than the doxographical work; the citations in Simplicius could indeed all come from contexts similar to some found in Aristotle, *Physics* 1, but the apparent distinction between *Naturalis historia* and *Naturalis auditus* in Priscian perhaps suggests that the former was *not* identical to the *Physics*. Cf. also now Gottschalk, above n.6, 557–8.
93. For *On Sleep and Dreams* cf. Diogenes Laertius 5.45; Pliny, *Natural History* 28.54; and perhaps Priscian, *Sol. ad Chosr.* 3 (*Suppl. Artist.* 1.2 p. 62.7ff. Bywater). Cf. D. del Corno, *Graecorum de re onirocritica scriptorum reliquiae*, Milan 1969, 68f. (I am grateful to Professor Gutas for this reference); Regenbogen 1402.
94. Cf. Athenaeus, 7.95 314bc, Apuleius, *Apologia* 41, Diogenes Laertius 5.43; and compare above, n.24.
95. Cf. Diogenes Laertius 5.43. The relation between them and the seven-book treatise *On Living Creatures* mentioned by Diogenes just afterwards, and to the title *Epitome of Aristotle on Living Creatures* (or: *Epitome of Aristotle's On Living Creatures*; also in seven books) in a later section of Diogenes' list (5.49), raises issues too complex to go into here, but cf. Regenbogen, 1424–6 and 1429; Sollenberger (above, n.5) 49 and n.43, and n.21 of his article in the present volume. Huby (above, n.2) has discussed the relation between Theophrastus' zoological treatises and Aristotle, *Hist. an.* 8 and 9; the whole question of Theophrastus' zoological works was discussed by Joachim, *De Theophrasti libris Peri zōiōn*, Diss. Bonn 1892, which I have not myself seen.
96. Diogenes Laertius 5.49; one book, *Peri zōiōn phronēseōs kai ēthous*. The relation of this title to Aristotle (?) *History of Animals* 9 is discussed by Regenbogen 1434–6, W. Fortenbaugh, *Quellen zur Ethik Theophrasts* (Amsterdam 1984) 128–9 and by Huby, above, n.2; cf. Flashar (above n.14) 42–4.
97. "Habitat" is the *first* meaning of *ēthos* in Liddell-Scott-Jones; but a title "On the intelligence and habitat of living creatures" might seem rather strange, and it may be that *ēthos* should be given a wider sense *including* that of habitat.
98. Athenaeus 7.104 317F. As Huby (above n.2) has pointed out, part of Priscian's discussion is in fact concerned precisely with differences between creatures depending on locality (*Sol. ad Chosroen* 8). There is a further problem over the relation between *On Differences according to Place* and *On Differences of Sound between Creatures of the Same Kind*, one of Diogenes' list of seven zoological works; the content of the one citation of this by name that we possess—the sound of partridges in different parts of Attica is different (Athenaeus 9.43 390A; *Peri heterophōnias tōn homogenōn*, omitting *zōiōn*)—would fit into a work *On Differences According to Place*, and other references too suggest that differences of sound in different localities were discussed by Theophrastus in addition to other types of local variation. (Cf. (i) on sounds, Aelian, *De nat. anim.* 3.35–8, and compare [Aristotle], *Mir. ausc.* 70; (ii) partly on sounds, Pliny, *Natural History* 10.79, *Mir. ausc.* 68; (iii) on other differences, Aelianus, *De nat. anim.* 3.32–3, 10.35, 11.40; Pliny, *Natural History* 8.173, 11.281; Gellius, *Noct. Att.* 16.15.1; Athenaeus 9.43

- 390C.) Cf. Regenbogen 1426. The fact that Athenaeus as well as Diogenes knows of two titles perhaps suggests that there *were* two different works by Theophrastus, rather than one being a subdivision of the other. (*On Differences*, given as a title in the second section of Diogenes' list, may be connected with the titles discussed above, but alternatively it might be a distinct, logical work.)
99. Plutarch explicitly links the octopus' change of color, which we know formed part of *On Creatures that Change Colour*, to a discussion of animal intelligence (*De sollertia animalium* 27 978F; cf. *Quaest. nat.* 19 916B). However, Theophrastus may have discussed the topic in more than one work.
 100. This is perhaps so even if, as Flashar argues, the material has been transmitted via *Hist. an.* 9. Cf. Flashar 42; Regenbogen 1434.
 101. Literally, "On Creatures that Live in Holes" (*Peri tōn phōleuontōn*). But the ancient citations make it clear that it is hibernation that is in question (see next note).
 102. *On Creatures that Hibernate* is cited by name at Athenaeus 2.63 63C, 3.65 105D, 7.95 314BC; cf. also Schol. on Theocritus *Idylls* 1.115 (a, p.67.8–10 Wendel), and Pliny 8.128 (above, at n.16).
 103. Three of the four poems are to be found in J.L. Ideler, *Physici et medici Graeci minores* (reprint Amsterdam 1963) 328–52; all four were edited by G. Goldschmidt, *Heliodori carmina quattuor ad fidem codicis Casselani*, Giessen 1923 (*Religionsgeschichtliche Versuche und Vorarbeiten* 19.2, 1–59). Cf. R. Reitzenstein, 'Alchimie und Mystizismus,' *Nachr. Göttingen*, Phil.-Hist. kl. 1919, no.1; also J. Lindsay, *The Origins of Alchemy in Greco-Roman Egypt*, London 1970, 275–7 and 379–81.
 104. Reitzenstein, pp.28, 36. It is probably this work that is alluded to in a reference to "Theophrastuses" by Michael Psellus, *Scripta minora* vol.1 p.322.19 Kurtz. Cf. also J. Ruska, *Turba philosophorum: ein Beitrag zur Geschichte der Alchimie*. Berlin 1931, 264f.
 105. Reitzenstein, 31. Goldschmidt 14 suggests that the author is neither perpetrating a conscious forgery nor intending to suggest that the list of achievements corresponds throughout to that of the historical Theophrastus; rather, he is presenting himself as a new Theophrastus. Even so, however, allusion to the works of the first Theophrastus would still be in place and so cannot be ruled out *a priori*.
 106. Reitzenstein, 31ff.
 107. Cf. Simplicius, *In De caelo*, *CLAG* 7 p.491.17–28, 493.17–20, 504.4–15; also [Alexander], *In Metaph.*, *CLAG* 1 p.703.17–23. I have discussed these passages in "Theophrastus on the Heavens", in *Aristoteles; Werk und Wirkung*, Paul Moraux gewidmet (above, n.6), at 590–3.
 108. Below, section VII.
 109. On which compare Anthony Preus' paper in this volume.
 110. On this cf. R.W. Sharples, "Theophrastus on Tastes and Smells", *Rutgers University Studies in Classical Humanities* 2 (above, n.5) 187–8.
 111. Cf. Goldschmidt, above n.103, 14 and 18. I am grateful to Dr. Obbink for emphasising this to me.
 112. *alloiophōnous* Huby, on the basis of Athenaeus 9.43 390A; *allelōphōnous* M, *allelōphonous* G. Cf. below, n.115.
 113. Cf. Sharples, above n.110, 184–93, which should now be emended in the light of the observations of Wöhrle and Sollenberger in the present volume. Theophrastus is cited as an authority on plants and flavors by Michael of Ephesus, in *Parv. Nat.*, *CLAG* 22.1 p.149.7. Cf. also Reitzenstein 31.

114. Athenaeus 7.95 314BC. Reitzenstein 31 is doubtful about the connection between Heliodorus and this work of Theophrastus, however; and see below, n.118.
115. Above, n.112. Reitzenstein 31 suggests that the manuscripts' *allelophōnous* is correct and that Heliodorus misunderstood the term *heterophōnias* as relating to the communication of birds *with each other*. The idea of a Theophrastus who could understand bird language like Dr. Doolittle fits in nicely with the attempt to represent the philosopher as possessing secret and magical wisdom, but one wonders whether Heliodorus should be saddled with such poor understanding of the Greek.
116. Athenaeus 9.43 390A. For other references to birds by Theophrastus cf. Aelian, *De nat. anim.* 10.35 (*On Differences?*; cf. id. 11.40, Athenaeus 9.43 390c, Gellius *Noctes Atticae* 16.15.1, Pliny *Natural History* 11.183), Athenaeus 9.37 387B (*On Animals* book 3), 9.46 391E, 14.69 654D (*Hypomnemata*), and Jerome, *In Hieremiam* 3.74.2 (CCSL vol.74 p.167.9–15; but Engelbrecht deleted the reference to Theophrastus here). Hens are mentioned in *On Creatures said to be Grudging* (below, section VII).
117. Dr. Obbink draws my attention to the term *muēsis* in lines 18 and 68.
118. There is moreover a question, as Dr. Obbink points out, whether it is natural or magical beneficial and detrimental effects that the author has in mind (the distinction being one that he himself would probably not recognise). Reference to the harmful and beneficial effects of various creatures might suggest the influence of the zodiacal signs, but Heliodorus' words seem to hint at wider and more detailed knowledge of many particular kinds of creature.
119. Above, n.99.
120. As is pointed out by Burnikel (above, n.46) 131, the sequence *On Sweat; On Giddiness; On Tiredness* is not found in any of our extant MSS.
121. To give a complete list of passages which may contain allusions to these works would take up too much space; cf. Regenbogen 1426–9, and for the relation to them of sections of [Aristotle], *Mir. ausc.* cf. Flashar's commentary on the latter (above, n.14). *On Creatures that Appear in Swarms* is probably the same as the work cited in the second section of Diogenes' list (5.46) as *On Creatures that Appear Spontaneously*; there are no ancient citations of the content of the latter by name.
122. Burnikel 134–5 and 135 n.10.
123. Above, n.9. Regenbogen 1427 seems to doubt the authenticity of the second part; but the existence of independent references to the mention of "horncast seeds" (below) is a strong argument for its authenticity. The structure of the treatise is discussed by Huby (above, n.2).
124. Plutarch, *Quaest. conviv.* 7.2 700cd suggests this; cf. also scholion on *Odyssey* 23.107, vol.2 p.719.2–5 Dindorf. See above, n.9.
125. Cf. Athenaeus 7.104 317F (above, n.18); Plutarch, *Quaest nat* 19 916b and *De sollertia animalium* 29 978EF.
126. The suggestion is not that Theophrastus regularly brought in irrelevant material, only that the same examples could relevantly be discussed in more than one context; and indeed in a number of cases Theophrastus seems to have said more in one context than another just because one aspect of a particular example was relevant in one context but not in another: for example, the lynx's alleged motive for burying the *Iynxgourion* is relevant in *On Creatures Said to be Grudging* but not in *On Stones*. See above, n.8.
127. For Theophrastus on the principles of the natural universe cf. Simplicius, *In*

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Phys., *CIAG* 9 9.5–10, 20.17–26; Philoponus, *In Phys.*, *CIAG* 16 4.8ff. This leaves aside the question of whether Theophrastus retains Aristotle's sharp distinction between the principles applying in the sublunary and those applying in the superlunary sphere; on his attitude to the Aristotelian doctrine of the ether cf. part I of my discussion mentioned in n.107 above.

128. In his review of Steinmetz (above, n.92) 25–6.

129. Cf. W.D. Ross and F.H. Fobes, *Theophrastus: Metaphysics*, Oxford 1929,xxv; and the papers of Dr. Vallance and Dr. van Raalte in the present volume.

PART II
PAPERS ON BOTANY
AND ECOLOGY

5

Theophrastus as Ecologist

J. Donald Hughes

Ecology, considered as a systematic discipline, is a young science. It was recognized as a separate field of inquiry only in the second half of the nineteenth century. But it can look back for precedents to the ancient Greeks, who moved to bring order out of chaos in so many realms of rational inquiry. Theophrastus of Eresus followed his teacher, Aristotle, in giving attention to the relation between an organism and its environment and, in so doing, pursued investigations that properly can be called ecological.¹

Theophrastus observed that a plant flourishes best in a "favorable place" or "proper country" (*oikeios topos*),² which modern ecologists might term its niche. Aristotle had made a similar point in regard to animals. The Greek word used here to characterize a harmonious relationship between an organism and its environment is *oikeios*, which is of course an adjectival form of *oikos* (house, domicile, habitat), the first of the two elements combined in "ecology." It is at least possible that the classically educated nineteenth-century German scientists who coined the latter word did so under the influence of the relevant passages in Aristotle and Theophrastus.³

Be this as it may, it is undeniable that sustained treatment of ecological questions can be found in the botanical writings of Theophrastus, namely in the *De historia plantarum*⁴ and in the first five books of the *De causis plantarum*.⁵ Elucidating comments also exist in his other surviving texts, particularly in the *Metaphysics*⁶ and the *De ventis*.⁷

In order to place Theophrastus' ecological observations in context, it is necessary to say something about his natural philosophy. Aristotle had said that nature does nothing in vain and always aims at what is best.⁸ Theophrastus prominently quoted both statements and agreed with them, adding, "Anything which is contrary to nature is dangerous."⁹ He is deeply concerned with the distinction between the natural and the unnatural. But how can anything in nature be unnatural? Theophrastus, while admitting the point of

this question, answered it by viewing nature in three different aspects. First, there is the nature of the plant itself, which aims at its own particular *telos* or purpose. This he called "the tendency of the plant's nature," which biological scientists today would term "genotype." Then there is the nature of the environment within which the plant exists, and which may act for or against the plant's *telos*. Finally, there is human agency, which may have a goal quite at variance with both the plant and the environment.¹⁰ What is natural for the plant is not necessarily provided by the climate and human tendance, so one may speak of freezing, say, or pollarding, as unnatural occurrences for a tree.

Here Theophrastus parted company with Aristotle. The master had said that all living things have a *final* cause, which is the service of the higher, rational nature. In other words, they exist to serve human beings.¹¹ But Theophrastus, in his *Metaphysics*, argued that "We must try to find a certain limit . . . both to final causation and to the impulse to the better. For this is the beginning of the inquiry about the universe, that is, of the effort to determine the conditions on which real things depend and the relations in which they stand to one another."¹² So he maintained that the nature of each living thing always aims at assimilating the intake to its own goal, and the goal of a plant is not to feed us or give us wood, but to produce fruit containing seed for the perpetuation of its species, that is, to produce offspring similar to itself.¹³ Aristotle would not have denied this, of course, but would have made it a subsidiary cause in his hierarchical organization of nature. For Theophrastus it is the whole point.

When Theophrastus looked at the relation between a plant and its environment, he observed that the nature of the plant may or may not find the nature of the place favorable. A plant seeks, so to speak, an environment where it may fulfill its purpose best. That place is the *oikeios topos* or *oikeia chōra* mentioned above. Each plant has a certain innate fitness for, or symmetry with, a particular kind of location, and this differs with the species. "Trees . . . seek their appropriate localities; . . . for some the preferred locality is dry, for others well-watered or wintry or sunny or shady: in a word, some favor the mountain, some the swamp. . . ."¹⁴ He distinguished among plants adapted to conditions of aridity (xerophytes), moisture (hydrophytes), and salinity (halophytes), and to various types of soil.

In order to understand Theophrastus' idea as to why particular species prefer particular environments, it is necessary to consider his descriptive method in general. He proceeded by establishing sets of two opposing characteristics, for example, male and female, cold and hot, wild and domestic, etc. The method is typical of the Peripatetic school and derived from Aristotle, who used it in his zoological classification. Perhaps it can be said that Theophrastus also used it in arriving at the descriptions of human personality types in his *Characters*. The method is also reminiscent of the medical doctrine

of humors derived by the physician Hippocrates from the theory of four elements advanced by Empedocles, which saw the human body and psyche as composed of two sets of opposing characteristics, hot and cold, wet and dry. Theophrastus, like Aristotle, avoided the reductionistic application of the doctrine of humors—his sets of characteristics are many more than two—but he was influenced by it, nonetheless. This is most evident from the place he gave to the discussion of the hot/cold and wet/dry pairs:

First come moisture and warmth: for every plant, like every animal, has a certain amount of moisture and warmth which essentially belong to it; and, if these fall short, age and decay, while, if they fail altogether, death and withering ensue.¹⁵

The earlier botanist, Menestor, had maintained that hot plants are best able to survive in cold countries, and vice versa.¹⁶ Theophrastus countered this with his observation, based on actually tasting and feeling them, that hot plants do, in fact, come from hot countries. In a similar way, an American might notice that chili peppers come from sunny Mexico. But Theophrastus' generalization from this is of the greatest importance, since it led him to the assertion that the nature of the plant matches the nature of the environment in which it grows best. This he applied to all the relevant characteristics. Dry trees, he said, like dry country, and moist trees like moist country.¹⁷ His list of other characteristics seems a strange mixture of genotypes and phenotypes. Among the more important are: male/female; black/white; domestic/wild; natural/unnatural; open/dense; rough/soft; deciduous/evergreen; fruitless/fruitbearing; flowering/flowerless; ready/stubborn, that is, how easily the seeds sprout; and strong/weak, that is, how true the progeny remain to the type of the parent.

Among the varying factors that comprise "place" or "country," or environment, Theophrastus included soil, moisture, temperature, exposure, winds, and elevation. Each of these affects the occurrence, growth, and appearance of plants. It should be noted, however, that Theophrastus was not advancing a theory of environmental determinism, in which external factors completely control the expression of characteristics in an organism, but the interaction of environmental factors with the plants' inherent tendencies. "For the general explanation that the countries are responsible for many irregularities . . . while true, needs to be supplemented by a consideration of the special powers and distinctions of the plant."¹⁸ Still, the locality determines which of several potential characteristics of a plant will appear. For example, some trees prefer the mountains,

But even on the mountains all trees grow fairer and are more vigorous when they have secured a suitable position; and, to speak generally, those which grow on the level parts of the mountains are specially fair and vigorous; next to these

come those which grow on the lower parts and in the hollows; while those that grow on the heights are of the poorest quality, except any that are naturally cold-loving. But even these show some variation in different positions.¹⁹

In general, trees produce the best wood if they grow in northern exposures, an observation that seems to have a point under Mediterranean conditions if not elsewhere. But different species prefer different kinds of locations; firs like the shade and pines the sun; thus he distinguished between shade-tolerant and shade-intolerant trees. Our author assigned a wide variety of effects to locality, including habit and rapidity of growth, occurrence of knots and quality of the wood generally, time of flowering and fruiting, production of seed, tendency to run true to type, shedding of leaves, and of course the survival of the tree itself. A tree can most profitably be studied in the locality most appropriate to it, where it grows naturally and shows its complete development.²⁰ Thus he recognized the importance of observing plants in undisturbed ecosystems. The fir, for example, is seen at its best in its congenial home, Macedonia.

Theophrastus' observations on differing environments were, however, not limited to larger regions such as countries. He was aware also of differences from one small district to another, that is, the phenomenon known to ecologists as microhabitats. These, he recorded, are particularly noticeable in montane terrain:

On great mountains, such as Parnassus, Cyllene, the Pierian and the Mysian Olympus, and such regions anywhere else, all kinds grow, because of the diversity of positions afforded them. For such mountains offer positions which are marshy, wet, dry, deep-soiled, or rocky; they have also their meadow land here and there, and in fact almost every variety of soil; again they present positions which lie low and are sheltered, as well as others which are lofty and exposed to wind, so that they can bear all sorts, even those which belong to the plains.²¹

He understood the effects of mountain topography on the winds, including the foehn or fallwind, and had observed orographic rainfall, both of which affect microclimates.²² He knew how the elevation of high peaks produced low, stunted growth in trees, in some species before others. As an illustration of the preference of plants for particular locations, he mentioned the occurrence of a flood in one district, which destroyed all the trees, but afterwards the same species sprang up in the same places.²³

Theophrastus also observed that certain plants that prefer a narrow range of environmental conditions have a limited distribution and tend to be isolated on mountains and islands: "Most mountains have certain peculiar products, whether trees, shrubs, or other woody plants."²⁴

Some mountains . . . do not thus bear all things, but have a more special vegetation to a great extent if not entirely; for instance the range of Ida in Crete,

for there the cypress grows; or the hills of Cilicia and Syria, on which the Syrian cedar grows, or certain parts of Syria, where the terebinth grows. For it is the differences of soil which give a special character to the vegetation.²⁵

He adds that on Mt. Ida in Asia Minor there are three trees that grow nowhere else; the Alexandrian laurel, a kind of fig, and the currant grape vine (it should be mentioned that the ancients considered the vine to be a tree). The Colutea tree grew only on the Lipari islands, a volcanic group.²⁶ He further observed that rivers often have plants unique to themselves.

The phenomenon of adaptation to a particular environment was known to him; he called it "mutation according to the place" (*metaballein kata tous topous*).²⁷ Of course he did not understand the genetic mechanism involved when he said that "the region keeps taking away from the nature of the plant,"²⁸ but his acute observation of the fact that such changes are noticed in the third year after the introduction of a strain of annuals into a new environment may well reflect the fact that, in hybrid crosses, it is the third generation that exhibits variation.²⁹

Thus far the discussion has been about what is called "species ecology," that is, the relationship of a particular kind of organism to its environment. It must be admitted at the outset that the major portion of Theophrastus' ecological comments were of this type. But he also investigated the effects that plants exercise upon one another when they grow in groups, and thus took a step in the direction of the concept of the ecosystem.

Theophrastus classified plants into four groups by habit of growth: namely trees (*dendra*), shrubs (*thamnoi*), sub-shrubs (*phrygana*), and herbs (*poai*). Although he did not extend this classification to plant communities, it is possible to see in it a rudimentary but workable scheme for Mediterranean associations; that is: forest, maquis, garigue, and grassland. Plants growing close together, he noted, may have either negative or positive effects on each other. The olive and myrtle, or the pine and bay, like to grow together, but the almond is almost always a "bad neighbor."³⁰ He described the spread of weeds. Trees growing close together in a forest, he observed, compete with each other for food, water, and sunlight, and become tall, slender, erect, and knotless, while those growing far apart have the opposite characteristics. The fir grows in height only until it reaches above the shadow of neighboring trees. A few plants injure others by odors, as the cabbage does the vine. Trees may destroy others by robbing them of nourishment and hindering them in other ways. Ivy lives in dependence on supporting trees and will kill them when it grows on them.³¹

This introduces the concepts of symbiosis and parasitism, which he comprehended without completely distinguishing them. Knowing Aristotle's example of animal symbiosis, he added some in which animals help plants. For example, the jay buries acorns which may sprout and birds spread mistletoe

seeds in their excrement.³² Then, plants aid other plants, as when decomposing evergreen leaves help seeds to sprout.³³ He understood that legumes enrich the soil for other plants. He knew that mistletoe is a separate plant, not a “change of nature” in its host, and that it “lives by taking the food that belongs to the tree.”³⁴

Diseases he divided into those that arise from the plant itself, and those that come from outside. In both cases, he believed, the environment plays a crucial role in their onset. Unsure whether to call death from disease a natural or unnatural occurrence, he placed it in a third category.³⁵ Insects, he pointed out, are often species-specific or limited to certain regions, and some plants have odors that repel them from themselves and other nearby plants.

The effects of human intervention on plants and the environment were by no means neglected by Theophrastus. Intensely interested in the problems of cultivation, plantation, and acclimatization, Theophrastus used the wild/cultivated dichotomy as one of his most important sets of descriptive characteristics. It is at least likely that he performed experiments of his own like those of Harpalus, whom he mentions, who tried to get exotic plants to grow in Babylon.³⁶ Perhaps from these instances of trial and error, he generalized that if plants are planted “as their nature requires” (*kata physin*), they will succeed, but if planted “against their nature” (*para physin*) they will fail.³⁷ Beyond that, he had observed plantations of forest trees in the mountains enough to advise that there the trees be planted at closer intervals than on the plain, since there they tend to have a slenderer habit of growth both in branches and in the roots, which do not spread so far. Fir, pine, and holly are naturally wild plants that tend to deteriorate under intense cultivation. Indeed, he suggested that one save the best land for cereals and plant trees on second-best land, since they do better there anyway.³⁸ He remarked about the ornamental plantations of cedars in Phoenicia, where these trees had grown to great size in the parks (paradises) of the Persian king and his nobles.³⁹ He advised careful note of the local environment, including its soil and weather, before deciding to plant there. Indeed, since it is only the climate proper to a plant that brings everything that is in the plant’s nature to completion, he concluded that “locality is more important than cultivation and tendance.”⁴⁰ Returning to his idea that each plant has its own natural goal, he said that unaided growth is natural, and therefore exhibits more clearly the *telos* of the trees.⁴¹ It is mankind, alone among all living things, to which the term “cultivated” is perhaps strictly appropriate.⁴²

Theophrastus also recorded anthropogenic changes in climate due to drainage and deforestation, which affect the ecology of entire regions. He remarked that in

the country around Larisa in Thessaly, where formerly, when there was much standing water and the plain was a lake, the air was thicker and the country

warmer; but now that the water has been drained away and prevented from collecting, the country has become colder and freezing more common. In proof the fact is cited that formerly there were fine tall olive trees in the city itself and elsewhere in the country, whereas now they are found nowhere, and that the vines were never frozen before but often freeze now.⁴³

In the mountains of Crete, there was extensive removal of forests, which allowed the winds free play and produced a general infertility so severe that agriculture became impossible.⁴⁴ Around Philippi, both deforestation and drainage had occurred, and in this case the result was a climate with less freezing, presumably because the trees formerly had trapped the cold air near the ground, whereas afterwards the winds could disperse it.⁴⁵ So widespread effects of human agency on the natural environment were recognized as early as the fourth century B.C. Attempts to control these effects were also known. Wise administrators limited timber harvest; Theophrastus said that in Cyprus "the kings used not to cut the trees . . . because they took care of them and managed them."⁴⁶ He also recorded regulations setting a maximum permissible harvest of silphium, a wild plant of economic importance in Cyrene.⁴⁷

All told, Theophrastus impresses us by his rationality and good sense, his wish to depend on observations and to criticize the reports he received. His practical attitude may be discerned in his rejoinder to those who advised him to plant and fell trees by the moon and the zodiacal signs: "One should not in fact be governed by the celestial conditions and revolution rather than by the trees and slips and seeds."⁴⁸

If he failed as a consistent ecologist, it was in concentrating his attention on individual species. Unlike modern ecologists, he did not emphasize the complex net of relationships in biotic communities. Seldom making quantitative statements, he never grasped the importance of the growth and decline of populations. This is especially unfortunate because Aristotle had observed reproductive potential and population crashes among rodents.⁴⁹ Neither had Theophrastus observed natural succession. In larger terms, he had less to say about the existence and life of the largest ecosystem, the biosphere, than Plato did.⁵⁰

But it is nonetheless true that his philosophical stance was more congenial to ecological discovery than was either Plato's or Aristotle's, emphasizing as it did efficient causes, not final causes. He accorded to plants an autonomous purpose, not dependent upon their place in the human scheme of things. His viewpoint was consistently ecological in the sense that he always discussed a form of life in the context of its relationships to the environment—to sunshine, soil, climate, water, cultivation, and other plants and animals. More than half of his botanical writings deal with this kind of ecological observation. In many cases he anticipated terms that would become part of the lexicon of scientific ecology. Many of his ideas have to be corrected in the light of more recent works; many others have so far withstood the test of time. But it

is hard to criticize him too severely, because he was one of the first to set out on the journey of inquiry that we call ecology. And among those who did this, he is the one who traveled furthest. If any ancient writer deserves the title, "father of ecology," it is he.⁵¹

NOTES

1. For the suggestion that Theophrastus was a forerunner in ecological studies, the author is indebted to A. E. Holch, "The Ecology of Theophrastus," MS, Denver, CO: University of Denver, 1958. Unfortunately, Holch did not live to complete his essay. Another who made much the same suggestion in the course of a more general article emphasizing Theophrastus is Henrich Rubner, "Griechischer Geist and Forstliches Wissen," *Allgemeine Forst-und Jagdzeitung* 136 (Frankfurt am Main, June, 1965, No. 6) 135–44, vide p. 142. Aristotle's ecology has been competently researched by Anthony Preus, *Science and Philosophy in Aristotle's Biological Works* (Hildesheim: Georg Olms, 1975).
2. Theophrastus, CP 1.9.3, 1.16.11, 2.3.7, 2.7.1, 3.6.6–7, etc.
3. *Oecologie* was apparently first used by Ernst Haeckel, *Generelle Morphologie der Organismen*, 2 vols. (Berlin, 1866). Haeckel was familiar with the classical texts and could easily have had in mind this use of *oikeios*. See Donald Worster, *Nature's Economy: The Roots of Ecology* (San Francisco: Sierra Club Books, 1977) 191–4.
4. The Greek text and English translation used here are those of the translator Arthur Hort in Theophrastus, *Enquiry into Plants*, 2 vols. (Loeb Classical Library, Harvard-Heinemann, 1916).
5. The Greek text and English translation used here are those of the translators Benedict Einarson and George K. K. Link in Theophrastus, *De causis plantarum*, 3 vols. (Loeb Classical Library, Harvard-Heinemann, 1976–). Only the first volume has appeared. I have graciously been allowed to consult the entire work in manuscript by the late Professor Einarson.
6. The Greek text and English translation used here are those of the translators W. D. Ross and F. H. Fobes in Theophrastus, *Metaphysics* (Oxford, 1929. Reprint, Hildesheim: Georg Olms, 1967).
7. The Greek text and English translation used here are those of the translators Victor Coutant and Val L. Eichenlaub in Theophrastus, *De ventis* (Notre Dame, IN: University of Notre Dame Press, 1975).
8. Aristotle, GA 1.23 731a5; GC 2.10 336 b27–28.
9. CP 1.1.1; 1.16.11; 6.4.2; *De sensu* 32, HP 4.14.6.
10. CP 5.1.1.
11. Aristotle, *Pol.* 1.5 1254b18–19, 1.8 1256 b15–26.
12. *Metaph.* 9.32–4. There is a good discussion of Theophrastus' teleology in Clarence J. Glacken, *Traces on the Rhodian Shore* (Berkeley: University of California Press, 1967) 51. See also J. Lennox, "Theophrastus on the Limits of Teleology," *Rutgers University Studies in Classical Humanities* 2 (1985) 143–63.
13. HP 1.2.2 and especially CP 1.16.3: the end of all plants is the generation of like.
14. CP 2.7.1.
15. HP 1.2.4–5.
16. CP 1.21.5–6.
17. CP 3.6.8.
18. CP 6.18.6.

19. *HP* 3.3.2.
20. *CP* 2.7.1, 3.6.7.
21. *HP* 3.2.5.
22. *Vent.* 45, 29, 5.
23. *HP* 3.1.2.
24. *HP* 3.18.1.
25. *HP* 3.2.6.
26. *HP* 3.17.2, 4.
27. *CP* 2.13.1.
28. *CP* 2.13.5.
29. *CP* 1.9.3.
30. *CP* 3.10.4–6.
31. *HP* 3.18.9, 4.16.5–6; *CP* 2.18.4.
32. *CP* 2.17.8. On “utility friendship” between animals and plants see the Theophras-
tean fragment preserved in al-Mubashshir, *Mukhtar al-hikam* 315.6–8 (Badawī) =
L105 Fortenbaugh (*Quellen zur Ethik Theophrasts*, Amsterdam 1984, 73) and the
commentary of Fortenbaugh on pages 282 and 297–8.
33. *CP* 2.18.1.
34. *CP* 5.4.5; 2.17.4.
35. *CP* 5.11.1.
36. *HP* 4.4.1.
37. *HP* 2.5.7.
38. *HP* 1.3.6; *CP* 1.18.1.
39. *HP* 5.8.1.
40. *HP* 2.2.8.
41. *CP* 1.16.10–11.
42. *HP* 1.3.6.
43. *CP* 5.14.2–3.
44. *Vent.* 13.
45. *CP* 5.14.5.
46. *HP* 5.8.1.
47. *HP* 6.3.2.
48. *CP* 3.2.5.
49. Aristotle, *HA* 6.36 580b10–20.
50. Plato, *Tim.* 30D.
51. See J. Donald Hughes, *Ecology in Ancient Civilizations* (Albuquerque: University
of New Mexico Press, 1975) 64–6; and “Early Greek and Roman Environmental-
ists,” in Lester J. Bilsky, ed., *Historical Ecology: Essays on Environment and Social
Change* (Port Washington, NY: National University Publications, Kennikat Press,
1980) 55–6.

6

Drugs and Psychic States in Theophrastus' *Historia plantarum* 9.8–20

Anthony Preus

The botanical work of Theophrastus has received very little attention from historians of philosophy, much less even than Aristotle's zoological works. Why has this been the case? Perhaps philosophers have not thought so highly of Theophrastus as of Aristotle, so not even the philosophical works of Theophrastus have received much attention; many of those who look at Aristotle's biology were first enticed by his metaphysical or logical works. And the botanical writings of Theophrastus contain even fewer passages readily construed as philosophical than do Aristotle's zoological books. Furthermore, botany is perhaps initially more obscure to most people lacking extensive scientific training than is zoology.

We all begin with considerable interest in the structure and function of our own bodies, then we extend whatever we have learned there to other animals in proportion to their resemblance to us. That anthropocentrism is, incidentally, a primary guideline to the understanding of Aristotle's zoological works. But in botany, whatever self-understanding we may have gained rapidly fails us. Plants seem quite other than ourselves; they are present in the world as entities as alien to our understanding as they are intimately and constantly entwined with our lives. Aristotle may have had some difficulty coming to terms with plants, for he depicts the plant as a strange sort of animal with its mouth buried in the ground, and its reproductive and excretory organs up in the air. Of human functions, the plant shares only in nutrition and regeneration of its kind, and thus we gather from his comments, it is a relatively uninteresting sort of entity for a philosopher to be examining.¹

But human and indeed all animal life depends upon the life of plants: the vegetable kingdom is the ultimate source of all our food and most of our clothing, shelter, and transportable energy. And this is the road toward the

common understanding of plants—their utility. There was in antiquity, and continues today, a tendency to classify plants according to the use made of them, giving rise to disputes over whether the tomato is a fruit or a vegetable, whether a poinsettia is a flower or a tree. In any case, the most useful information about the structure and life of plants almost inevitably comes from those who cultivate them for human utility, or who have learned from practical experience the uses—and the dangers—of wild varieties.

Unquestionably, Theophrastus has gathered a great deal of information from those who cultivated or gathered plants for practical uses. Even the gross organization of his treatises reflects his understanding of the character of his sources; for example, the *Causae plantarum* (*CP*) uses as a major distinction that between the consequences of human intervention and natural, or nonartificial, effects observed in plants.

But Theophrastus is more than simply a mirror of his sources. He has in fact philosophical motivations for his research, motivations that are similar to those that brought Aristotle to zoological investigation. Indeed, we can see those motivations clearly enough in the general project of the *Historia Plantarum* (*HP*), since the entire work is primarily concerned with the study of the *parts* of plants, just as Aristotle's *History of Animals* is primarily concerned with the parts of *animals*. Theophrastus is investigating “natures,” and those natures are the functional parts of the entities that he investigates quite as much, sometimes more than, the entity as a whole. Even in the *HP*, his main concern is “causal” in the Aristotelian sense; on the one hand, he gathers information that tends to explain in terms of matter, mover, form, and end why the parts of plants are as they are, and on the other, what the effects of the parts of plants may be upon the rest of the world. The latter is the major theme of book 9.

Since the natures of roots, fruits, and juices have many and varied powers, some having the same power and being causes of the same effects, others the opposite, we might wonder about something that is also a common problem in other puzzles, whether those that cause the same effect do so in virtue of one power, or whether they can cause the same thing with different causes. (9.9.4) This clearly *explanatory* puzzle guides the gathering of information; while we cannot say that *HP* 9 actually answers this most interesting question, we can agree that asking it places the investigation clearly within the Aristotelian scientific tradition.

HP 9, starting at chapter 8, is concerned with the parts of plants as *pharmaka*, as bringing about health, disease, or death (9.18.3 lists the effects studied thus); at 9.8.1 Theophrastus tells us that he is going to talk about “juices” (*opoi*) that have “powers as drugs” (*pharmakōdeis* . . . *dunameis*), and about “roots” (*rhizai*) and all the other parts with pharmacological properties, including fruits, derived juice (*chulismos*), leaves, and “herbs” (*poa*). He does

not say that he is going to talk about *species* as *pharmaka*; when we read his text in that way, it is an imposition of our way of thinking on his text. This is another way in which Theophrastus' work in this book is clearly a successor of Aristotle's zoological studies.²

My initial motivation in studying these chapters was to attempt to find in them whatever indications there might be of the existence in Theophrastus' day of psychotherapeutic uses of drugs, of "psychopharmacology," properly so-called. Although there are no perfectly clear examples of drug therapy for psychological maladies in these chapters, two sorts of evidence bear on the question: one sort of evidence is the large collection of stories, largely of folk origin, surrounding some of the drugs that are discussed. Those stories reflect psychological attitudes toward the plants in question, and those belief systems may have been relied upon for therapeutic (or nontherapeutic) ends by their uses. The other sort of evidence is of several herbal medicines that are in fact chemically psychoactive, and in at least two instances, that psychological activity is noted by Theophrastus, not necessarily with therapeutic goals in mind, however. My general goal in this paper is to suggest ways of placing these chapters of *HP* 9 into the context of the history of ancient psychotherapy.

FOLKLORE IN *HP* 9: SOME PSYCHOLOGY OF DRUGS

Everyone who reads *HP* 9 is fascinated by the many elements of folklore that have found their way into Theophrastus' account, most of them apparently from the stories of the "drug-sellers and root-cutters" upon whom he has relied for so much of his information. Theophrastus, like Aristotle before him, readily gathered information from anyone who appeared to have knowledge of which he could make use.³ Those sources preserved a great deal of the wisdom of the people and reflect explanatory systems that are certainly not what we would call peripatetic; Theophrastus was both fascinated and puzzled by the claims, and the explanations, offered by these sources. *Pharmaka*, "medicines" in the sense in which that term is used in connection with folk "medicine-men," cannot readily be separated from the belief structure within which they are administered. The "medicine-man" surrounds the "medicine" with a mystique, starting from the way in which it is gathered, and continuing to the way in which it is given to the patient—or victim. The digging of a powerful root is dangerous, and the tapping of a powerful sap is also perilous, for the birds, or unnamed powers in the world, are observing this interference with the continuity of nature.⁴ And the continuities in the world are, for the medicine man, discovered in the resemblance of the part of the plant, the "herbal," to what is to be cured, prevented, or caused, so the root that looks like a scorpion is thought to be good for scorpion bites, and the root that

looks like testicles influences male fertility. These notions do not fit readily into the peripatetic causal system, but Theophrastus does not spurn them. He preserves those stories in his text, and he worries about them.

The mystique surrounding the *pharmakon* does help preserve the monopoly of the root digger or drug seller: if gathering the plant requires a complicated ritual to avoid coming to harm, the layman is the more likely to keep away from it. Likewise in our own day, the knowledge that some mushrooms are deadly poisonous helps prevent amateurs from gathering even the readily recognizable of the edible varieties. Not only does this help to protect the supply, but the stories of danger surrounding the gathering of the plant help to raise the price at point of sale. The mystique also contributes greatly to the efficacy of the medicine when administered, for the belief that the agent will bring about the effect often is sufficient of itself to bring about the effect. The hopes and fears surrounding herbal medicines constitute the first group of “psychic states” to which I want to call attention in this essay. The second group of “psychic states” are those that are in fact caused by the pharmacological properties of the plants administered, for some of the parts of plants used as *pharmaka* by the ancients were in fact chemically active; their effects did not depend solely upon a belief structure, but could readily be attributed to biochemical effects.⁵ Later, we will return to a discussion of two clear examples of psychoactive drugs in *HP* 9. For now, we should look at some examples of the close relationship between beliefs and expected effects of *pharmaka*.

For example, in 9.8.5–6, Theophrastus reports that he has been told that when you cut *thapsia* you should put on oil and stand to windward, or your body will swell up, or if you dig hellebore, have some garlic and unmixed wine first.⁶ He seems more or less prepared to believe these stories, because he thinks that the plants may well have what we would call chemical properties that might require such protection. Theophrastus does not, however, believe the story that you must dig up the *glukusidē* peony at night,⁷ because if you gather the fruit in the daytime and the woodpecker sees you, you will go blind, and if you are digging the root, you will suffer a prolapsed anus. While he thinks it not unreasonable to offer a prayer while cutting a plant (9.8.7), he finds the offerings to be given and the rituals to be performed “absurd” (*atopon*). Mandrake and black hellebore are thought particularly powerful medicine by the tradition,⁸ for to cut mandrake root “it is said that one should draw three circles around it with a sword, and cut it facing west; at the cutting of the second piece one should dance around the plant and say as much as possible about sexual intercourse” (9.8.7). Black hellebore too is cut when a circle has first been drawn around it, but facing east, and saying prayers, and besides watching out for an eagle both from right and left, since if an eagle approaches, the cutter will die within the year. Needless to say, Theophrastus

does not believe these stories, but his sources believed them, or very much wanted their clients to believe them. Later, in 9.16.4, Theophrastus preserves at least two different traditions concerning *akoniton*,⁹ one of them a rather carefree folk tradition, which ignores the law forbidding its possession and is ready to try antidotes like honey and wine.¹⁰ A last example, for now, in 9.19.2–3—Theophrastus finds “foolish and incredible” what people say about amulets and charms for the body or for the house. The idea that *tripolion* is “useful for every good purpose,”¹¹ or that snapdragon can give you a good reputation, and the like, “comes from people who want to brag about their own arts.”

A COMMENT ON LLOYD

G. E. R. Lloyd, in *Science, Folklore and Ideology*, largely compares HP 9 with the Hippocratic medical texts. He finds that Theophrastus is really quite different from the Hippocratics in that he reports, and partially credits, the stories he has gleaned from the drug vendors and root cutters. Lloyd also shows that Theophrastus is considerably more careful than the Hippocratics about designating the particular varieties or identifications of the medicinal plants named. The Hippocratic writers seem to assume that the reader knows the precise identification or variety. Further, Theophrastus includes some *pharmaka* which seem not to be mentioned in the Hippocratic texts. There is also a difference in emphasis between Theophrastus and the Hippocratics, but Lloyd does not mention it here: The Hippocratic physicians typically propose *dietary* remedies, relying first on a selection among the normal foods consumed by their clients. If we look at *Regimen in Acute Diseases*,¹² we notice frequent mention of various preparations of barley, honey, and wine. Theophrastus has relatively little to say about those sorts of remedies. To be sure, in chapter 23, the author of *Regimen in Acute Diseases* lists as purges black hellebore and *peplion* (identified by means of Dioscorides IV.169 as *Euphorbia peplis*); Theophrastus lists as purges hellebore in 9.9–10, and a plant related to *peplion*, *tithymallos* (identified as *Euphorbia pilosa*), in 9.11. More typically, chapter 64 of *Acute* mentions “drinks made from barley, herbs, raisins or the second pressing of grapes, from wheat, thistle or myrtle, pomegranates and the rest.”¹³ The context indicates that these preparations are meant to be medicinal rather than nutritional.

Lloyd recognizes that Theophrastus and the Hippocratics are “largely independent” of each other (p. 120), but he thinks that they both relied upon the root cutters and drug sellers (p. 121). Indeed, it seems impossible that Theophrastus used the Hippocratics as an important source for his information about plants, for he reports that his sources seem to be in agreement that ritual is required for the taking of “roots” (HP 9.8.8), while the Hippocratics,

as Lloyd points out, breathe scarcely a word of any such thing. So Lloyd claims that the milieu within which the Hippocratics practiced was influenced by the sorts of stories recounted by Theophrastus: “even though the Hippocratic writers do not refer to folk beliefs, their existence may well have made a difference to the expectations of their patients and to the popularity of certain drugs” (p. 131). He thinks that there were two parallel traditions, that of the rationalistic Hippocratics, and that of the “supernaturalistic” temple physicians and folk healers, so that the Hippocratics are assumed to have known the stories recounted by Theophrastus, but not to have been interested. We may find some slight evidence in favor of this interpretation in the texts of Plato and Aristotle.¹⁴ More importantly, a look at the works of the teachers of Theophrastus might help us understand both his general approach and some of the details he recounts.

PHARMACOLOGY IN PLATO AND ARISTOTLE

Theophrastus certainly ought to have known the writings of both Plato and Aristotle—he was a student of Plato, and a colleague of Aristotle, and he must have participated in many discussions with both. We do find many parallels between the ideas of Theophrastus and those of the masters of the Academy and Lyceum in the botanical works as elsewhere.

For the ancients, Plato’s theory of medicine was contained in the *Timaeus*, but the theory of diseases in that dialogue (81 ff.) does not include much information about possible medicaments:

Diseases unless they are very dangerous should not be irritated by medicines, since every form of disease is in a manner akin to a living being, whose complex frame has an appointed term of life. . . . If anyone regardless of the appointed time tries to subdue them by medicine, he only aggravates and multiplies them. Wherefore we ought always to manage them by regimen, as far as a man can spare the time, and not provoke a disagreeable enemy by medicines (89B–D).

In this Plato was, as Galen argues in *The Doctrines of Plato and Hippocrates*, a good deal closer to the Hippocratic tradition than we often think. Occasionally, when he is attacking newfangled regimens that enable men like Herodicus to stretch out their useless lives, he becomes more conservative than the Hippocratics, and praises the old-time remedies, like the cup of Pramnian wine sprinkled with barley and grated cheese mentioned in *Rep.* III.405E, referring to *Iliad* XI.638–641.

One charming bit of medical practice depicted by Plato is clearly psychosomatic in character, relying on the power of suggestion, or the placebo effect: in the *Charmides*, Socrates proposes to cure Charmides’ headache with the use of a leaf, and a charm of *kaloi logoi* (155E ff.); the plant from which the leaf is

taken is not mentioned, nor is it important. What is important and relevant in the present context is that Socrates gains the attention of the young Charmides by telling him that he learned how to administer it “from one of the physicians of the Thracian king Zalmoxis who are said to be able even to give immortality” (156D). Magical remedies obviously have a certain popularity for the generation of Charmides, if Socrates gains the confidence of the young man by suggesting that he has a ritual (the “charm”) for the giving of this “medicine.”

Remembering that *pharmaka* are as likely to be used to cause negative effects as positive, we are reminded of the passage in the *Republic* (VI.488C) in which mutineers “stupefy the worthy shipmaster with mandrake,” *mandragora*. This was, as we have already noticed, regarded as powerful medicine requiring special rituals for its collection in the time of Theophrastus. This same mandrake is mentioned, along with others, as sleep-inducing (*hupnotikon*) by Aristotle at *PN (Somn.)* 456b31; Theophrastus too mentions its use *pros hupnon* (9.9.1). Neither Scarborough nor Lloyd refers to these passages in Plato and Aristotle, incidentally. Lloyd’s account of mandrake’s pharmaceutical activity (p. 132) is not entirely clear; Scarborough tells us that its chemical components make it similar to stramonium and belladonna in producing lethargy.¹⁵

And of course there is the *pharmakon*, taken to be hemlock (*kōneion*, *Conium maculatum*), with which Socrates was executed. Scarborough does discuss the parallel between Theophrastus’ recipe for a fatal dose in *HP* 9.16.8–9 and the information contained in *Phaedo*, 63D5–E5 and 117B6–9 (p. 379).¹⁶ His discussion of this issue is quite adequate.

In a more mellow mood, Plato tells how good singing can be encouraged in *Laws* II.666A–C: boys under eighteen will be forbidden to taste wine; until thirty, men may make moderate use of wine, “but no carousing;”

But when a man is verging on the forties (he may) ask the presence . . . of wine, *pharmakon* against the austerity of age, so that we may rejuvenate, and the *dusthumia* be melted to softness by forgetfulness of our heaviness.

I think that Plato is recommending wine as a remedy against the cares of maturity.

More can be found in Aristotle. For example, poppy, mandrake, wine, and darnel, are mentioned as *hupnotika* in *PN (Somn.)* 456b29 ff.; Aristotle does not specify *which* poppy he has in mind, but I imagine that he is thinking of the opium poppy. Theophrastus, in *HP* 9.13.3–5, compares several varieties of wild poppy, and says of none that it is soporific; Scarborough draws the consequence (p. 372) that Theophrastus was relatively unfamiliar with the medicinal uses of the opium poppy, that the opium poppy may not have been widely known in those days. I believe, however, that Aristotle’s listing of

poppy *first* in an account of “hypnotics” would tend to indicate that he thought of the poppy as a strong somnifer, and that in turn increases the probability that he knew *Papaver somniferum*. If Scarborough is right in thinking that the cultivated and the opium poppy were, in antiquity, identical, then an additional indication that Aristotle knew the opium poppy is its mention in *HA* IX.40, 627b17, as a plant which beekeepers should plant around their hives, along with pear trees, beans, Median grass, Syrian grass, yellow pulse, myrtle, creeping thyme, and almond trees. It is just possible that Aristotle’s *mēkōn* is *Papaver rhoeas*; Scarborough takes this to be the poppy to which Celsus refers as a somnifer and which Theophrastus lists as a bowel purge (9.12.4).

Some have thought that the *nepenthes* that Helen uses in *Od.* IV.221 ff. to reduce the sorrow of the assembled company was a preparation from opium poppy, but Theophrastus does not identify that drug with a specific plant. At *HP* 9.15.1, he paraphrases the passage in Homer, and simply says that *nepenthes* was something Helen had brought with her from Egypt. Pliny, *NH* 20.199, clearly *did* know the opium poppy; he describes how the juice is extracted and says that the dried sap can be so strong that it can kill. He mentions several unbearably ill persons who did away with themselves with its aid. This brings us back to the text of Theophrastus, 9.16.8: Thrasyas of Mantinea (as Scarborough notes), discovered a drug for a swift and easy death, which included hemlock (*kōneion*), poppy (*mēkōn*), and others of the sort. This placement of poppy beside hemlock in a fatal poison certainly weakens Scarborough’s claim that Theophrastus did not know the opium poppy; at least it is very likely that Thrasyas of Mantinea, one of Theophrastus’ root-cutting sources, knew the opium poppy.¹⁷

Omitting, for the moment, Aristotle’s mention of wine as a soporific, I must say something about “darnel.” *Airai*, taken to be *Lolium temulentum*, is also mentioned as “sleep-incuding” (*hupnotika*, *PN* 456b31). This is a rye grass, whose seeds could be ground for meal; certainly it was regarded as toxic by some later authors, but it is not entirely clear just how and in what circumstances it proves toxic. Some studies have argued that the grain itself is toxic, others that the grain is toxic when ergotized.¹⁸ Theophrastus mentions the plant (*HP* 1.5.2, *et al.*) as a weed found with food grains; he says nothing about any pharmaceutical properties.

Another place where Aristotle lists several pharmaceutical properties of plants is in *HA* IX.5–6, 611b–612b. The passage is actually about the intelligence of animals, but I take it that the stories are meant to show that animals seek herbal remedies *just as human beings would*, or even (in some cases) more intelligently than the average person. The entire section is a real jumble of animal lore; in many ways the passage is comparable to passages in *HP* 9, both in its presentation of folklore stories, and in its themes. In fact, we

may say that *HA* IX seems particularly “Theophrasean” in comparison with other parts of the biological works.¹⁹

One of the stories is about an animal acting to prevent human beings from acquiring something medicinal—the doe eats the afterbirth so quickly that one cannot get it, but it is “supposed to have medicinal properties.”²⁰ Just previously, Aristotle reports that “when a stag is stung by a tarantula or similar insect, it gathers crabs (?) and eats them; it is said to be a good thing for man to drink the juice, but the taste is disagreeable.”²¹ The word “crabs” is obviously wrong; probably Aristotle had some word for *dittany* in this place, since he goes on to tell (more) about the uses to which animals put dittany in what follows, and the claim that “dittany juice is good for man” is supported by the tradition (cf. Dioscorides III.37). Theophrastus says (9.16.1) that “dittany is peculiar to Crete,” and scarce even there. He says it is especially useful in childbirth, and then goes on to say that “the story of the arrows is also said to be true,—that if goats eat it when they have been shot, it rids them of the arrow.” Where has he gotten the story? Quite possibly from the very passage of Aristotle which we have been discussing, and which continues: “Wild goats in Crete are said, when wounded by arrows, to go in search of dittany, which is supposed to have the property of ejecting arrows from the body.”²²

Aristotle, in the same chapter, goes on to tell of the habit of dogs eating grass when they are ill to induce vomiting (also told again, in slightly different words, or near enough, at 612a30, and at VIII.5, 594a28); later in the chapter, he tells of several animals that treat themselves by eating *origanon* (marjoram) or by putting it on a wound.²³ Theophrastus writes of the cultivation of *origanon* several times but does not seem to mention the plant under this name in his pharmacological section.

Aristotle also tells of *pardalianches*, which means “panther-killer” (it kills lions too). Apparently hunters would put out some of this poison where the leopard would find it; the leopard, having eaten some, would seek human excrement, because it is an antidote. So the hunters put a container of excrement up in a tree and wait till the panther comes along to kill it.²⁴ The translators of *HA* seem to be in agreement in identifying the “panther-killer” with aconite. This herbal drug is discussed in a somewhat jumbled passage in Theophrastus, 9.16.4–7, where Hort identifies it as “wolf’s bane,” or *Aconitum napellus* L. Theophrastus says that because the doctors don’t know how to prepare it, they use it mainly as a “septic and so on,” but of course those who know can make a deadly poison of it.²⁵ Indeed, Theophrastus reports that aconite, when properly prepared, can cause a very painful, lingering death at a calculated time in the future. Scarborough speculates (pp. 377–8) that Theophrastus may have heard about the most powerful of the aconites, *Aconitum Ferox*, or Indian aconite, used in India as an arrow poison to kill

large animals, but seems puzzled about the source of the information. But if Aristotle's "panther-killer" would have to be some "Oriental" form of aconite, we do not need to seek very far for a possible origin for some of Theophrastus' understanding of this herbal poison, even though the stories told by Aristotle and Theophrastus are quite different. On the other hand, *Aconitum napellus* is poisonous enough to kill large animals effectively.

Before we leave the chapter in *HA*, we might mention the use that the weasel makes of wild rue (*pēganon*). It eats some of this plant because the smell is "noxious to the snake" (612a28). Theophrastus says much about wild rue in other parts of the *HP*, but nothing about its use as a snake chaser. Aristotle also speaks of a *drakōn* which, when it eats fruit, has some juice of the *pikris*, translated by Thompson as "endive" and by Louis as "bitter lettuce." Theophrastus does say that the *pikris* is bitter to the taste and has flowers most of the year. Hort does not identify it *ad loc.*, *HP* 7.11.4.

There is a curious passage in Scarborough's essay in which he argues that *HP* 9 "stands solidly within Aristotelianism" (p. 364) on the strength of a reference to the use of seal rennet as a remedy for epilepsy (9.11.3). To be sure, as Scarborough says, Aristotle found the seal a quite interesting animal, but the passage in the *Corpus Aristotelicum* that says essentially the same thing as Theophrastus says here is *De mirabilibus* 77 835b32, a treatise surely not by Aristotle himself. However, the Photius summary of "On Animals Said to be Grudging," L9 Fortenbaugh, tells the same story about the seal (lines 6–8, 14–15). We might argue that the *De mirabilibus* could be traced to Theophrastus, or his influence.

If we wanted to argue that Theophrastus did not use Aristotle's biological works directly, I suppose that it would be possible to defend that claim by ascribing to a joint source, possibly Diocles, the stories that they share, but it seems to me much more reasonable to accept the obvious truth that Theophrastus does stand solidly within Aristotelianism, and to accept the evidence above as additional grounds for believing that truism. It would not, I think, have been necessary to argue the case had not the two most recent commentators on *HP* 9 called it into question by omission.

The Aristotelianism of Theophrastus bears on our understanding of Theophrastus' conception of the psychological element in the uses of drugs, for his reasons for recounting so many of the "folklore" stories told to him certainly included the motivation that brought Aristotle to tell quite a few himself, especially in *HA*, and throughout the biological works: both Aristotle and Theophrastus believed that to reach the truth one must *tithenai ta phainomena*, which means to set down the common accepted opinions on the subject at hand. By doing so, they may preserve many elements of superstition, but they also preserve bits of accurate observation to which a more dogmatic investigator might have been blinded by a preconceived theory. The

rationalism (or professionalism, if you prefer) of the Hippocratic is in danger of shutting out some truth, along with much error.

PSYCHOACTIVE DRUGS IN *HP* 9

A good place to start our discussion of the several psychoactive drugs in *HP* 9 would be with 9.11.5, and the discussion of the plants called *struchnoi*: “one causes sleep, the other madness.” Leaving aside the sleep inducer, let us turn to the discussion of the *manikos* in 9.11.6. Theophrastus tells us that this is also called *thruoron* or *peritton*, and has a white hollow root about a cubit long. This *strychnos* is identified with the thorn apple, *Datura stramonium*; its leaves and seeds contain atropine, hyoscyamine, and scopolamine.²⁶ Modern pharmacologists make an extract of this plant for use as an anticholinergic and antiasthmatic. Before Leva-Dopa, this extract was used in the treatment of Parkinson’s disease. The chemical components, atropine, hyoscyamine, and scopolamine, are also used individually in modern pharmacology; atropine sulfate is used particularly as an antispasmodic, and large doses are given as an antidote to certain insecticides and “nerve gases.”

The accuracy of the observations reported by Theophrastus may be measured by a comparison of what he says about *strychnos manikos* with what the *Physician’s Desk Reference* (*PDR*) says about atropine, one of its active ingredients.²⁷ Theophrastus says that with one drachma ($\frac{3}{20}$ of an ounce) in weight, the victim (Hort says “patient”) becomes playful and thinks himself marvelous; “twice this dose (is given) if he is to go mad outright and have delusions; thrice the dose, if he is to be permanently insane; (and then they say that the juice of centaury is mixed with it); four times the dose is given, if the man is to be killed” (trans. Hort). The *PDR* says, “Doses of 0.5 to 1 mg of atropine are mildly stimulating to the central nervous system. Larger doses may produce mental disturbances; still larger doses are depressing. Death from atropine poisoning, though rare, is usually due to paralysis of the medullary centers.” Those descriptions are remarkably similar.

More generally, we may note that the series of effects, from mood elevation, through hallucinogenic and permanently psychosigenic, to fatal, is one which is familiar from psychotropic drugs in our own day; however, Theophrastus envisages someone inflicting these effects on someone else, while we have seen many cases of self-inflicted psychotropism. Kingsbury (p. 281) says that *Datura* has been used for its hallucinogenic properties, and notes that its common American name, jimsonweed, derives from the mass poisoning of soldiers sent to Jamestown, Virginia, to quell the Bacon rebellion in 1676.

We do not find, I believe, indications in Theophrastus’ text that *strychnos manikos* was used with psychiatric intent. Despite Hort’s translation, the clear notion is that the plant is a *poison*, to be inflicted on others. A somewhat closer

approach to a psychiatric use of one of the plants called *strychnos* (quite possibly the “hypnotic” rather than the “manic”) may be found in the Hippocratic texts. Lloyd (p. 128) cites in *On Internal Affections* the prescription of half a cotyle (about $\frac{1}{10}$ litre) of the juice of *strychnos* with half that of *melikreton*, in water, with the yolk of a boiled chicken’s egg, as a painkiller to be taken daily. Lloyd remarks that if *strychnos manikos* were used, that quantity would kill more than the pain. Possibly the Hippocratic author refers to the “hypnotic” kind of *strychnos*; Theophrastus says that this one, soaked in wine, is given as a drink to induce sleep. Scarborough identifies this *strychnos* as *Atropa belladonna* (confusingly enough, sometimes identified as a kind of mandrake). Belladonna also contains atropine; if Scarborough’s identifications are correct, possibly the dosages tended to be higher in preparations from the *Datura stramonium* than from the *Atropa belladonna*. Incidentally, we may remark there are several belladonna preparations on the market even today. One of them (“Prydon Spansule” capsules, put out by Smith Kline & French) is used as an antispasmodic and antisecretory agent in cases of peptic ulcer.

At 9.13.4 Theophrastus, discussing “sweet-tasting roots,” tells us that “there are some that cause mental derangement (*ekstatikas*), as the plant like the golden thistle (*skolumos*) which grows near Tegea: of this Pandeois the sculptor ate, and went mad (*exestē*) while he was working in the temple” (trans. Hort). The information which Theophrastus gives is insufficient to identify the plant, and Scarborough does not, I think, discuss it at all.²⁸ Still, we have here evidence of drug self-abuse; *ekstatikai* and *exestē* have connotations of a state of mind which might well be sought by a sculptor while working on a big project. The implications of the words is, I think, toward the *manic*, which might be temporarily advantageous if the sculptor had a deadline for completion.²⁹ At 9.19.1, Theophrastus turns to *pharmaka pros de tēn psychēn*; having recalled the earlier discussion of *strychnos*, he adds only one more, the root of the *onothēras* or oleander, which “administered in wine makes the temper gentler and more cheerful.” He describes the plant: it “has a leaf like the almond, but smaller, and the flower is red like a rose. It is a large bush; the root is red and large, and exudes a fragrance like wine; it loves mountainous places.” That it smells like wine does not seem strange, since it has the “power” of wine, *dynamis* . . . *oinōdēs*. Scarborough tells us that the plant is *nerium oleander*, and that from it is derived oleandrin (foinerin), used in modern medical practice for cardiac insufficiency. It is also a powerful diuretic. Scarborough does not pursue the psychotropic faculties of the plant, nor have I found any indication of those faculties in the modern literature.³⁰ Still, we have here a definite indication of a positive psychotropism in the text of Theophrastus; on the strength of this reference at least, we may say that he was aware of the possibility of a pharmacological psychotherapy, at least in its earliest stages.

Many medical writers in antiquity recommended the use of black hellebore as a purge for melancholics; some such authors thought of this use in a way which we would recognize as “psychiatric.” Such a use is at least suggested by the opening chapters of the Hippocratic *Aphorisms* book IV, and made much of in Dioscorides IV.151 and Celsus III.18.20, where too the use of white hellebore is recommended for cases of “hilarity.” Theophrastus does not, however, suggest a psychiatric use for either sort of hellebore. Possibly Theophrastus did not hear of a use of hellebore against melancholy; we should notice too that the Aristotelian *Problemata* XXX.1 discusses melancholy at considerable length without mentioning hellebore for its treatment. Another possibility is that Theophrastus saw this use simply as a purge, and the fact that melancholics are given purges perhaps does not seem to him a direct psychological effect of the purging agent.

The mention of melancholy brings us, at last, to the question of the therapeutic uses of wine. In *Probl.* XXX.1, wine is mentioned as both cause and cure of melancholy, and Plato is listed among the famous creative melancholics, which may help to explain the mention of wine as a mood elevator in *Laws* II, already noticed above. Theophrastus mentions wine as a mood changer only by implication, in *HP* 9, when he says that the power of oleander resembles that of wine. In the fragments of his work *On Drunkenness*, however, he echoes Plato’s *Laws*, saying that wine is a remedy for the *dysthymia* of old age.³¹ In *HP* 9, Theophrastus does discuss the paradoxical effects of certain wines upon fertility, in the passage omitted by Hort. It seems appropriate to include here a translation of that passage, with a few brief comments.

DRUGS AND SEX IN *HP* 9

A Translation of Theophrastus HP 9.18.3–11

(3) And in relation to our own bodies, apart from powers for health and disease and death, they say that herbs have other powers not only on bodily things but also on those of the soul [here Hort ends]. I mean by ‘bodily’ those concerned with generation and infertility. In fact some (plants) do both from the same part, for example the so-called *orchis* [testicle];³² for as there are two < roots >, a large and a small, the large root, if given in milk of a mountain goat, makes one more functional for intercourse; the small one harms and prevents. This plant has a leaf like the squill but smoother and smaller; the stem is very like that of the euphorbia used in unburnt offerings³³ or that of the *akantha*.

(4) It is absurd, as I have said, that both effects should be caused by one and the same nature, but it is not absurd that there should be such powers. Even Aristophilos the drug-dealer from Plataea said that for both effects he had certain powers; one which results in increased potency, the other which results in complete impotency. The impotency from it can be either total or temporally delimited as, for example, two months or three months, so that it can be used on servants when one wants to punish and discipline someone.

(5) Some are effective for the generation of males or females, for which reason they call *phyllon*³⁴ either ‘male-maker’ or ‘female-maker’; both have a form similar to that of the basil; the fruit of the female-maker is like the blossom (*bryon*) of the olive but greener; that of the male-maker very like the olive when it has just grown from the blossom, but double like human testicles. To make sperm infertile [i.e., as a contraceptive] they say to give the fruit of the white-berried ivy;³⁶ to make it fertile, give the fruit of the willow-weed³⁶ in water.

(6) This grows like “flame-flax”³⁷ but the fruit is like millet. And they say that one will be unable to generate also if one drinks the fruit of the honeysuckle³⁸ in white wine continually for thirty days, having gathered the equivalent of a *choinix*³⁹ each day. If one finishes the course of drinks one will be entirely infertile.

(7) The leaf of the “mule” plant⁴⁰ makes women infertile; they say to mix in some hoof and skin of mule. This leaf is like the skolopendro⁴¹ leaf; but the roots are slender; it loves mountainous and rocky places; besides, mules like it very much; it is also used for the spleen as is the honeysuckle.

(8) Lady fern (*thelypteris*)⁴² is useful for the flatworms and hairworms; for the flatworm soaked in honey, for the hairworm given in sweet wine with barley. They say that if it is given to a woman it will abort the fetus, if not make her infertile forever. The lady fern differs from male fern (*pteris*)⁴³ in that male fern has the leaf on a single stem, and a great long black root. The powers, then, of these parts relate to generation.

(9) Most marvelous is the plant which Indos⁴⁴ had; they said that it keeps the penis hard, not by ingesting the plant, but using it for anointing; the power of this plant is so great that one can have sex with as many women as one likes—those who use it say as many as twelve. Indos himself—he was big and strong—actually said that he once had sex seventy times, but his semen came out drop by drop, and finally he drew out blood. Besides women are considerably more eager when they use this drug. This power, if it is true, is excessive.

(10) But in general that there should be some such natures which make people more sexually excited is not absurd, for we see such natures in the nutritive juices contained in both moist and dry foods, and they can also bring about other effects. For example, they say that in some places the water makes women more likely to have children, as in Thespia, some places it makes them infertile, as in Pyrrha; that’s the explanation the doctors gave.⁴⁵ In Heracleia of Arcadia they say there is a wine which drives men out of their wits when they drink it, and it makes the women infertile;

(11) also in Achaea, and especially around Kerynia, there is a kind of vine whose wine makes pregnant women abort; if bitches eat the grapes they too abort. As far as taste is concerned, neither the grape nor the wine causes any peculiar sensation in comparison with others. In Troezen the wine makes those who drink it infertile; in Thasos they make a certain wine which causes sleep, and another which causes wakefulness in those who drink it. These are the powers in relation to the body and bodily functions. [end ch. 18, return to Hort]

Comments

Theophrastus brings together most of his comments on the relationships between herbals and sex in this section. Elsewhere in book 9, there may be mention of at least two “love potions,” mandrake (9.9.1) and cyclamen

(9.9.3), if that is how we interpret *pros (eis) philtra*. But in neither instance do we have any information about *how* these herbals were used to enhance one's love life. The information provided in 9.18.3–11 is much more detailed and open to verification.

The first herbal is a root, that of the *orchis*; indeed, the story goes that the *orchis* has two roots, resembling testicles, and one is large, the other small; if one has some of the large one mixed with mountain-goat milk, one's sexual powers are improved. On the other hand, if one has some of the smaller, it causes decreased functioning. This story is a good example of the doctrine of "signatures" which was to have a great history in subsequent centuries. Theophrastus seems not overly impressed with the signature argument, but is genuinely puzzled about the possibility of the same "nature" having opposite effects. Immediately prior to this passage, in 9.8.2, Theophrastus says that the *theluphnon*, "which some call "scorpion-plant because it has a root like a scorpion, kills that animal if it is shredded over him. . . . and it is useful as a drink against a scorpion's sting." Theophrastus, noting what we call the signature argument, comments, "Now if what has been told about the scorpion be true, then other similar stories are not incredible. Indeed stories are not composed without a reason." Similarly, after the story about the *orchis*, Theophrastus goes on, "It is absurd that both effects should be caused by one and the same nature, but it is not absurd that there be such effects." Yet he is willing to credit the story of Aristophilos who claimed that one of his drugs could either improve or destroy a person's sexual capacity, and he tells of an herb, the *phyllon*, which seems to have two varieties, one of which encourages the generation of male children, the other, female children. One may imagine that the doctrine of signatures has played a role in this notion, since the bud (fruit?) of the "male-maker" *phyllon* is described as resembling testicles.

The so-called mule plant is also an example of the signature theory at work, for this plant, beloved of the infertile mule, makes women infertile—especially if mixed with hoof and skin of a mule.

I have no comment at this time concerning the other contraceptive and aphrodisiac plants, except to note that the description of the effects of Indos' erection-maintaining plant is verifiable to the extent that the Indos' description of his own experience certainly does indicate that he had engaged too often in the lists of love.

In this section, Theophrastus is quite concerned about a single nature causing opposite effects; in order to deal more effectively with the question, he includes discussion of essentially nutritive materials in order to mention, for example, the reputation of various waters for influencing fertility both positively and negatively. Here Theophrastus arguably refers to a known Hippocratic text—*Airs, Waters, Places*. Theophrastus also discusses the virtues of various wines, in order to cite those which have one effect on men, another on

women, and also to mention other sex-related effects of wine. From his point of view, it is at least odd that the same natural substance should affect different people differently.

We may discern in this passage several phases of the struggle which Theophrastus had with the concept of *physis*, nature. If a part of a plant, or some other natural substance, has paradoxical or opposed effects, then Theophrastus seems to suppose that we should expect to find within that plant or substance two opposed natures, each bringing about its characteristic effects only when presented with the appropriate material.

A COMMENT ON THEOPHRASTUS AND TAXONOMY⁴⁹

G. E. R. Lloyd suggests that plant taxonomy was one of Theophrastus' objectives (*Science, Folklore, and Ideology* p. 121), and in this he was anticipated by the translators of Theophrastus' botanical writings, in the Loeb series. In view of the argument presented by Pierre Pellegrin, in *La Classification des Animaux chez Aristote*, that Aristotle was not aiming at a consistent taxonomy, did Theophrastus break with Aristotle on this point, and join the eighteenth century, or not? Benedict Einarson writes:⁴⁶

Aristotle first classified animals and gathered information about them in the *History of Animals*; he then proceeds to explain certain common or distinctive characters in (his other biological) treatises. . . . So Theophrastus first classifies and identifies plants and gathers information about them in the *Historia Plantarum*, then proceeds to account for certain common or distinctive characters in the *De Causis Plantarum*.

Einarson also asserts that as a taxonomist, Theophrastus falls short of modern standards:

Theophrastus does not have the taxonomic terms of modern botany, such as class, genus, species, variety. He uses *genos* ("kind") or *diaphora* ("difference") of the different kinds of vine and also of the great classes "terrestrial" and "aquatic." This is because the *genos* is of the nature or essence of a plant.⁴⁷

Pellegrin has amply shown that Aristotle a) did not aim at the development of a taxonomy of animals; b) did not use the words *genos* and *eidos*, or any others, for classes of animals of set levels in such a way that those designations could lead in any straightforward way to any later taxonomy; c) did not fail or fall short of modern taxonomy because he was not aiming at taxonomy. If we look at what Einarson says about Theophrastus, we find that a similar debunking is called for: he says that Theophrastus had a taxonomic project, but that Theophrastus deliberately used the Greek words which *might* have designated fixed classes of plants in ways which immediately preclude that

interpretation—*genos* and *diaphora* are both used in talking about different kinds of grapevines, and also to distinguish land plants from water plants, just as Aristotle uses the word *genos* both at the level of what we would call a variety of subspecies of bird, and to distinguish not only between animals with blood and those without, but even between living and nonliving entities.

Sir Arthur Hort does not deserve quite as much tar from the same brush, largely because his introductory comments are not so precise on the subject of Theophrastus' possible taxonomic project that we can immediately see where or even whether he has gone wrong.⁴⁸ Hort wonders whether Theophrastus first learned his "principle of classification" from Plato or from Aristotle, but thinks that the principle was

for the first time systematically applied to the vegetable world. Throughout his botanical works the constant implied question is, 'What is its *difference*?' 'what is its essential nature?' viz., 'what are the characteristic features in virtue of which a plant may be distinguished from other plants, and which make up its own 'nature' or essential character?'

That is close enough to the truth, if we do not read in more than what he says. On the other hand, the headings he supplies in the translation can be quite misleading, since they indicate that the first two chapters of *HP* are about how plants should be classified, when they really are about the differences among the parts of plants, and not about classifying at all. In 1.3.1 Theophrastus (much like Aristotle in *HA*) tells us that our study will be more illuminating if we "divide according to *eide*," and then he gives as *prōta kai megista* the three classes, shrub, "phriganon," and herb. He soon (1.3.5) gives a list of binary distinctions: wild/cultivated, fruitbearing/fruitless, flowering/flowerless, ever-green/deciduous. But these distinctions all cut across the "first and largest" classes, and each other, and are immediately asserted to hold inconsistently. We may say that Theophrastus is constantly classifying, but most often he is classifying *parts* of plants, rather than what we would call *species* of plants, and it is practically impossible to find any consistent hierarchical arrangement of plants in his botanical writings.

Theophrastus does not aim at what we would call a taxonomy of plants, a classification of plants into genera and species; rather, in the *HP* he aims at discovering the differences, *diaphorai*, between plants, and in particular the differences between their parts, on the model of Aristotle's *History of Animals*; in the *CP* he aims at understanding how plants function and reproduce, much as Aristotle's *Parts* and *Generation of Animals* are aimed at that sort of understanding of their objects. Pellegrin's analysis of Aristotle's classifications of animals would also work on the orderings of plants presented to us in Theophrastus' botanical writings. In particular, the word *genos* seems to be consistently related to the generative ancestry of the plant—members of a

genos are all thought of as possibly descended from the same original plant, at least as a first approximation. *Eidos*, as in Aristotle, normally refers primarily to the *appearance* of the plant, and is much rarer; Theophrastus, unlike Aristotle, uses the word *idea* for naming subdivisions, and as we have already noticed, at least in a methodological passage, he does not seem reluctant to use negative characterizations, a practice discouraged by Aristotle in *PA* I and on the whole avoided by him. The most common word for a group of plants is *diaphora*; the *diaphorai* presented by Theophrastus are both numerous and crucial for the execution of his project, that of *defining*, or setting out the essence of, each kind of plant. But there is no hierarchical arrangement, and consequently no true taxonomical project in Theophrastus' botanical writings; we should not interpret Theophrastus as having attempted to accomplish the work of Linnaeus, but failing (as Einarson seems to assert); rather, we should attempt to discern what Theophrastus was aiming at, and then to judge his successes and failure according to those goals.

SOME CONCLUSIONS

This essay has ranged rather far afield; we began by posing to ourselves essentially two questions: does Theophrastus discern some psychotherapeutic uses of drugs, and does he discern some effect of psychological states upon the action of drugs? In other words, we were seeking the relationship of *HP* 9 to the history of psychiatry. In response to those questions, we may notice that Theophrastus indeed reports stories that might have been in part calculated to create expectations of the working of drugs, but he does not analyse the extent to which the working of drugs depends upon the expectations of the patient (or victim) in comparison with the extent to which the "nature itself," as he would put it, brings about the effects. Theophrastus rather more seriously looks for "real" or pharmacological effects of the herbals he studies, and does note a few cases of psychological effects; whether therapeutic or malicious is another matter. His interest is not that of a medical person, as Lloyd already noted, but that of a scientist, concerned with discovering the natures present in the living world of plants.⁵⁰

NOTES

1. Some passages in which Aristotle compares plants and animals are: *PA* IV.10, 686b36, II.3, 650a21; IV.4, 678a10; *LA* 4, 705a28; *GA* II.3, 736b13; II.7, 745b26; IV.67, 774b26. Scattered through his writings are a great many comments on plants; the general tenor of those comments are first, that the characteristics of plants are continuous with those of animals (the lower animals hardly differ from plants, *PA* IV.5, 680b10ff), and plants differ from animals in that they have *fewer* soul-powers than animals (*de An. passim*, e.g. II.12, 424a23). There are

references in his works to a work *On Plants*, but the *De plantis* which is included in the Corpus was written long after his death.

2. Neither John Scarborough nor G. E. R. Lloyd has adequately emphasized the Peripatetic character of *HP* 9 in their essays on this book, even though both have considerably advanced the study of this work in other respects.

John Scarborough, "Theophrastus on Herbals and Herbal Remedies," *Journal of the History of Biology*, XI.2 (1978), 353–85, argues convincingly for the authenticity of *HP* 9. Following Max Wellmann, he claims that Theophrastus relied largely upon the work of Diocles of Carystos in book 9, in addition to the "drug-sellers" and "root-cutters" to whom Theophrastus refers explicitly (cf. Max Wellmann, "Das älteste Kräuterbuch der Griechen," in *Festgabe für Franz Susemihl* [Leipzig, 1898], esp. 22–31; and *Die Fragmenta der sikilischen Artze* [Berlin, 1901]). In fact Scarborough does not single out specific bits of information which he takes to be derived from Diocles; he generally compares the account in Theophrastus with those to be found in Dioscorides, Galen, Oribasius, Nicander, Celsus and Pliny. Scarborough also tries to identify the plant-names with modern species and to give the pharmacological actions, as determined by modern pharmacology, of the herbals discussed. For all of that, and much more, I refer the reader to his essay. On the matter of Diocles, it is worth mentioning that Wellman took Diocles to be rather early, older than Aristotle; Jaeger took up the matter again and actually gave two different dates for Diocles, both closer to the time of Theophrastus. But Theophrastus could have used Diocles no matter which date is correct. W. Jaeger, *Diokles von Karystos*, Berlin, 1938; see also his article, "Diocles of Carystos," *Philos. Rev.* 49 (1940) 393ff, and L. Edelstein's review, reprinted in his *Ancient Medicine*, Baltimore 1967.

G. E. R. Lloyd, *Science, Folklore and Ideology*, Cambridge UP, 1983, pp. 119–35: "Theophrastus, The Hippocratics and the Root-Cutters: Science and the Folklore of Plants and their Use." The major emphasis in his essay is upon a comparison between Theophrastus and the Hippocratic medical texts, largely with an eye to finding what sorts of things Theophrastus must have picked up from the drug-sellers and root-cutters. While there is nothing shocking in the idea that Theophrastus might have made use of the Hippocratic texts, just as Aristotle did in writing his *Generation of Animals* (see my "Aristotle and Hippocratic Gynecology" in *Aristoteles als Wissenschaftstheoretiker*, ed. J. Irmscher & R. Müller, Berlin, 1983), in fact Lloyd's evidence points rather strongly against Theophrastus having much use of those books for the writing of *HP* 9.

3. For Aristotle's use of various sources, see e. g. my *Science and Philosophy in Aristotle's Biological Works*, Hildesheim 1975, pp. 21–42. Aristotle relies upon drug-sellers for information in *HA* VI.18, 572a22,b22, 577a13, and probably again in IX.5, 611b26, at the least. He also relies upon seers and prophets, in addition to hunters, fishermen, shepherds, and so on.
4. Marlein van Raalte claims in her essay in this volume that Theophrastus differs from Aristotle in putting more emphasis upon such continuities in nature, and correspondingly less upon teleological explanations.
5. Lloyd emphasizes folklore and ideology in his essay, while Scarborough emphasizes pharmaceutical implications.
6. *Thapsia* is identified by Dioscorides (*The Greek Herbal of Dioscorides*, trans. John Goodyer, 1655; ed. R. T. Gunter [1934] New York 1959; subsequent references to "Dioscorides" are to this 'edited translation') and Hort (Sir Arthur Hort, *Theophrastus, Historia Plantarum*, Loeb, London, 1916; subsequent references to

“Hort” are to this work) as *Thapsia garganica*; according to Dioscorides (in the 1655 Goodyer translation), “it behoves him that takes ye liquor not to stand against ye wind, but rather to doe it in still weather. For it puffs up ye face mightily, & ye naked parts are blistered by the sharpness of ye exhalation.” According to G. B. Wood & F. Bache, *The Dispensatory of the United States* (Philadelphia 1882) (subsequently referred to as “*Dispensatory*”), “great care is necessary, in removing the roots from the bales [in which it was shipped in the nineteenth century], not to be injured by the powder which escapes, and which causes itchings and swellings of the face and hands.” *Thapsia* was, according to *Dispensatory*, used as a “local irritant and revulsive.”

Hellebore, *Helleborus niger*, or “Christmas rose”: according to W. C. Muenscher, *Poisonous Plants of the United States* (New York 1947), its rootstocks and leaves contain helleborin and helleborein, and are poisonous on contact. “Bruised parts may produce a severe dermatitis in susceptible persons.” According to *Dispensatory*, hellebore is a drastic hydragogic cathartic. There is another plant called hellebore in Dioscorides, *Veratrum album*. Dioscorides ascribes abortive powers to both plants, incidentally.

Garlic and onions are two pharmaceutically interesting plants which Theophrastus does not otherwise discuss in *HP* 9, although the Hippocratics made frequent use of them both; see also *Problemata XX passim*, and Eric Block, “The Chemistry of Garlic and Onions,” *Scientific American* March 1985, pp. 114–19. Theophrastus here perhaps thinks of garlic and strong wine as fortifying, rather than as *pharmaka*. Gloves would be more to the point.

7. *Paeonia officinalis*, according to Hort. See also Dioscorides III.157; *Dispensatory* recounts its use as an antispasmodic and anti-epileptic agent.
8. *Mandragora* is identified as *Podophyllum peltatum*, or “May-apple,” by Muenscher; he says that the rootstocks may cause severe dermatitis. John Kingsbury, *Poisonous Plants of the United States and Canada* (Englewood Cliffs NJ 1964) (subsequently identified as “Kingsbury”) follows the same identification and points out that the cytotoxic properties of this plant (especially the root) have led to research study of its chemical components as therapeutic agents in cancer. Hort, in his index, indicates that the *mandragora* refers to two different species, *Mandragora officinarum*, and *Atropa belladonna*. Scarborough, p. 360, seems to take *Atropa mandragora*, *M. officinalis*, and *Podophyllum peltatum* to be identical, but I am assured by my botanist consultant, Professor George Schumacher, that they are not at all the same plant. *Atropa mandragora* and *Atropa belladonna* are indeed closely related, and probably account for the references to *mandragora* in Theophrastus, as Hort says. Dioscorides, IV.76, identifies *mandragora* as *Atropa mandragora*, and adds many interesting stories to those told by Theophrastus.
9. “Aconite” is discussed below, under “panther-bane.” Cf. Scarborough, *op. cit.* pp. 375–7.
10. Here we have a mention, without discussion, of what I will call “nutritional” remedies; Theophrastus does not here attempt to examine the claims of honey and wine to be *pharmaka*, though both often appear in the Hippocratic prescriptions.
11. *Aster tripolium*, according to Hort.
12. Included in G. E. R. Lloyd, ed., *Hippocratic Writings*, Penguin, 1978.
13. *Ibid.* p. 203, tr. Chadwick & Mann.
14. Ludwig Edelstein, in “Greek Medicine in its Relation to Religion and Magic,” (*Bull. Hist. Med.* 5 (1937) 201–46, reprinted in *Ancient Medicine*, ed. Temkin & Temkin, Baltimore, 1967) took *HP* 9 as evidence for his general thesis that

pharmaka had largely lost their pre-classical “magical” character in about 700 B.C., and regained it in the days of Theophrastus (cf. Scarborough p. 359). Incidentally, Edelstein also argues that it is plausible for Theophrastus to have accepted the doctrine of sympathies, and thus that Hort was wrong to have omitted 9.18.3–11; I believe that Hort left it out because either he or his editor was offended by the sexual references, or possibly by the references to abortifacients. See below for my translation of the passage in question.

15. Scarborough, pp. 360–1, assuming that mandrake is *Atropa mandragora*. According to *Dispensatory*, mandrake is considered a *narcotic*.
16. See also Scarborough’s note 131, and especially Christopher Gill, “The Death of Socrates,” *Class Quart.* 67, ns 23 (1973). Kingsbury, pp. 379ff, discusses especially the veterinarian consequences of *Conium maculatum*.
17. Opium poppy seems to have been known in the Hellenic world from quite early times; Robert Temple, *Conversations with Eternity*, London, 1984, pp. 49–59, prints photographs of both Minoan and early classical pots clearly depicting the unique seed pod of the opium poppy, held in the hands of a goddess or priestess.
18. Kingsbury, pp. 485–6. “Classic darnel poisoning was only occasionally fatal. Symptoms in man consisted of apathy, giddiness, or a feeling of intoxication, accompanied by ataxia, various abnormal sensations, mydriasis, nausea, vomition, gastric pain, and diarrhea” (p. 486). If ergot is the agent, see Kingsbury pp. 79–86; intentionally or unintentionally ergotized rye breads have been claimed as the cause of all sorts of medieval oddities from Joan of Arc’s visions to the nuttier Crusades, and various compounds of the chemical derivatives of ergot have pharmaceutical uses even today. See S. W. Jackson, “Unusual Mental States in the Medieval Europe,” *Journal of the History of Medicine and Allied Sciences* 27 (1972) 262–97. For modern uses, see *Physician’s Desk Reference (PDR)* under Ergotrate Maleate, for example.
19. This resemblance has led some to believe that *HA IX* was not written by Aristotle at all, but perhaps by Theophrastus, or another member of the Lyceum. Work by David Balme and Allan Gotthelf has tended to support the genuineness of all the *HA*, through book IX. Photius summarized a minor treatise by Theophrastus which had the title, *On Creatures that are Said to be Grudging*; material in both *HA IX* and *HP 9* could have been included as well in a treatise of that name; see R. W. Sharples’ essay in this volume, sections V and VII, and especially W. W. Fortenbaugh, *Quellen zur Ethik Theophrasts*, Amsterdam, 1984, pp. 18–19 for the Photius summary, 159ff for comments.
20. *HA IX.5*, 611b25–6; cf. Fortenbaugh, *op. cit.*, L9, line 17.
21. Aristotle *HA IX.6*, 611b21. I haven’t seen the Peck/Balme Loeb *HA* vol. III, so I do not know what they do with the word “crab”, *karkinous*. That must have been the reading in antiquity, because it is followed thus by Pliny and Aelian (cf. Thompson *ad loc.*), but Pliny and others also tell a related story inserting “dittany” (*diktamnon*), which would make some sense. Louis proposes *origanous* with the idea of identifying it as *Origanum dictamnus*, or Cretan dittany. According to *Dispensatory*, dittany was used in the 19th century as a vermifuge.
22. *HA IX.6*, 612a1. The same story is told in *De mirabilibus* 4, 830b20. Scarborough, commenting on Theophrastus’ discussion of dittany, cites neither parallel passage (pp. 374–6).
23. *Origanum viride*, most likely.
24. There is a slightly different version of the story in *De mirabilibus* 6, 831a3ff: “Men say that in Armenia a certain poison grows, which is called leopard’s bane. So,

when a leopard is seen, they anoint a victim with this, and let it go. When the leopard touches it, she goes, it would appear, in quest of human excrement. Therefore the hunters put it in a vessel, and suspend it from a tree, so that the leopard, by leaping up towards it and becoming exhausted, may be paralysed by it and fall into their power."

25. Lloyd seems to have missed this chance to comment on the echo of professional competition between the root-cutter and the physician; I have not been able to find a place in the Hippocratic texts which corresponds with what Theophrastus says here, and it is possible that he is only echoing the claim of the "medicine-man." According to Kingsbury, p. 127, *Aconitum napellus* is extremely toxic, and can kill within hours; he mentions, but does not discuss, therapeutic uses of aconite extract discussed in older literature. Dioscorides mentions only the uses as animal poisons (IV.77, 78).
26. See Scarborough (p. 367) for the identification and analysis. Scarborough omits any discussion of the psychological effects of the *Datura stramonium*, which is a pity, since those effects are prominently emphasized by Theophrastus in this place. Kingsbury, p. 280–1, says that "hyperirritability of the central nervous system is noted. Subjects become delirious, incoherent, and perform insensible motions commonly picking at imaginary objects on themselves or in the air. . . . Subjects may become violent and dangerous to themselves and others." He refers to H. Jacobziner & H. R. Rabin in *NYSJMed* 1960 and 1961 for further information.
27. Atropine Sulfate (Lilly), Injection.
28. LSJ take the *skolumos* to be *Skolymus hispanicus*; E. S. Forster translates *skolumos* as "artichoke" in a verse of Hesiod (*Op.* 582, 586) quoted at *Problemata* IV.25, 879a27. I have not found artichokes to be *ekstatika*.
29. Cf. Aristotle, *Div. Somn.* 464a25, which says that *ekstatikoi* are "very sensitive to outside influences" and consequently have prophetic dreams. And perhaps they might be more creative artistically. See also *Categories* 10a1 and *PA* II.4, 650a34, which says that bulls and boars are *ekstatikoi* because their blood has a lot of fibers in it.
30. To be sure, *Dispensatory* mentions "narcotic symptoms" in relation to *Oenothera*; the plant includes chemicals resembling digitalis (see Kingsbury, p. 31, for the chemical structure of oleandrin; he mentions the "cardiac glykosides" of oleander elsewhere in his book). In Dioscorides, IV.118, this plant is identified as *Oenothera biennis*, or evening primrose. A botanist friend called my attention to a Hoagy Carmichael tune which has the line, "New Orleans in June, Oleander in bloom," a reference to the heady odor.
31. See Fortenbaugh, *op. cit.*, L129 ff. The citation of the *Laws* is quoted by Athenaeus, *Deipnosophistae* 11, 463c.
32. Dioscorides: identified as *Orchis rubra*, *O. papilionacea*. "And of this it is said that if the greater root is eaten by men, it makes them beget males, and the lesser, being eaten by women, to conceive females. It is further storied that ye women in Thessalia do give to drink with goates milk ye tenderer root to provoke Venerie, & the dry root for ye suppressing, dissolving of Venerie. And it being drank, ye one is dissolved by the other." Hort in his index identifies the larger *orchis* as *O. papilionacea*, the smaller as *O. longicruris*. I think that Hort's interpretation is mistaken and that Dioscorides is right in thinking that the theory is that *O. papilionacea* has two roots, a large and a small. LSJ make clear that the plant is called "orchis" because of the similarity of the root to testicles; no doubt the root was used for the preparation, as Dioscorides says, and thus my translation of some

rather vague Greek. *Dispensatory* says that *Orchis mascula* indeed has two bulbs, resembling testicles, but that the supposed aphrodisiac qualities are “illusory.” Very possibly Hort relied upon the grammar of the sentence for his interpretation; if the suppressed reference is to root, *rhiza*, one should expect *megalēs* and *mikras* instead of *megalou* and *mikrou*. One solution would be to supply the neuter diminutive *rhizion*.

33. Dioscorides IV.177: *Euphorbia apios*; this plant is cited in *Dispensatory* as a severely acting emetic and cathartic. For more on various *Euphorbiae*, see Kingsley, pp. 185–90. “Squill” translates *skilla*, and “akantha” translates *akantha*, of which Theophrastus lists at least a half dozen varieties, in various parts of the *HP*.
34. Dioscorides: *Mercurialis annua*. “Phyllon, some call it Elaeophyllon, some Bryonia, it grows on rocks. That which is called Thelygonon having as it were moss, the leaf greener than ye Olive, a thin short stalk, a slender root, a white flower, a greater seed, as it were of Poppy. But Arrhenogonon in other things is like to yet afore–spoken but differs, having ye seed, like Olives coming in a cluster out of the flower. It is said that Arrhenogonon being drank bringeth males but ye Thelygonum causeth females. Crateuas relates this concerning these, but he seems to me, to relate these things, according to ye report of them.” *Dispensatory* cites *Mercurialis annua* as a purgative and emmenagogue; Kingsley says that consuming it can cause anemia.
35. Identification by Hort: *Hedera Helix*, or English ivy. (Hort’s index of Greek plant names to *HP* includes the section omitted in text and translation.) See Dioscorides II.210: “. . . the juice, and the clusters being drack doe cause sterilitie, and being taken in too great a quantitie doe trouble the minde.” Kingsley notes that in smaller doses it is a purgative, in larger doses there are symptoms of excitation of the nervous system; labored respiration, and ultimately coma and death may result.
36. Hort: *Polygonum Persicaria*; cf. Dioscorides III.139, where the “willow-weed” is said to have leaves like those of the “*Melampyrum* . . . but seed like *Milium*,” but I find no entry for *Melampyrum*. *Dispensatory* considers this plant an antiseptic.
37. Literal translation of *linon pyrinon*, not identified by Hort.
38. *Klumenon*, *Lonicera etrusca*, identification by Hort, LSJ; in 9.8.5, Theophrastus says that it should be gathered early in the morning, before the sun strikes it. I can attest that the flowers of the honeysuckle smell sweetest then. In Dioscorides IV.14 *klumenon* is identified as *Convolvulus arvensis*, or Morning Glory, with the contraceptive quality included among its virtues. I recall people eating morning glory seeds for supposed psychedelic properties.
39. A *choinix* measures approximately a pint, dry measure.
40. Hort, LSJ: “milt waste”, *Asplenium ceterach*. This is a fern; several ferns have definite chemical effects.
41. Literally, “caterpillar”; Hort and LSJ identify it as “hart’s tongue,” *Skolopendrium vulgare*, which would be *Asplenium skolopendrium*, noted in *Dispensatory* as an astringent, but not very strong.
42. Literally, “female pteris,” identified by Hort and LSJ, following Dioscorides III.187, as Bracken, *Pteris aquilina*; the common name is “Lady Fern.” The *Dispensatory* says that it was used as a vermifuge. Kingsbury, p. 106, says that it poisons animals through action of a thiaminase (it destroys the thiamine in the body of several species of animals which may eat it.)
43. Identification as “male fern” or *Aspidium filix-mas* by LSJ; see also Dioscorides IV.186. Kingsbury notes that this fern too is the source of a vermifuge, and that it too contains a thiaminase (p. 101).

44. The Greek would also support the translation “The Indian.”
45. This could be taken to be fairly clear reference to *Airs, Waters, Places* 7–9; Lloyd does not notice this single reference to a Hippocratic text in the course of his discussion.
46. B. Einarson, *Theophrastus. De Causis Plantarum*, Loeb, Introduction p. ix. Pierre Pellegrin, *La classification des animaux chez Aristote*, (Paris: Paris Press, 1982; English translation, by Preus, University of California Press, 1986.)
47. Einarson, op. cit., p. xvii.
48. Hort: Introduction pp. xxi–xxii.
49. On this topic see also the paper of Allan Gotthelf in this volume.
50. I thank George Schumacher and Dennis Schmidt, who read and gave important comments on an earlier version, and I am very grateful to W. W. Fortenbaugh for his many detailed comments, as well as to my commentator at the London Theophrastus Conference, James Longrigg, and to several others who suggested important improvements. Finally, I thank Meredith Pell, who has saved me from several remaining errors.

Historiae I: plantarum et animalium

Allan Gotthelf

That being is manifold is clear; for perception both studies the differences and searches out the causes (or perhaps it is truer to say that it passes this on to thought, in some cases simply generating a search, in others by producing an *aporia*, through which, even if thought cannot advance, yet some light makes its appearance in our non-light as we search further).

There is no understanding (*epistasthai*), therefore, without some difference, for if things are other than one another, there is a difference; and within universals, the things that fall under the universal being several, these too must differ, whether the universals are kinds or forms. Almost all understanding (*epistēmē*) is of *idia*, for the *ousia* and the *ti ēn einai* of each thing is *idion* to it, and the attributes that things are observed to possess of themselves and not incidentally would be found to have been *ti kata tinos*. But generally it belongs to a body of understanding (*epistēmē*) to grasp what is the same in several things, whether it is said in common and universally or in a way as *idion* with respect to each, e. g. of numbers and lines, of animals and plants; a complete one has both. But while in the case of some things there is a universal end [for *epistēmē*] (for their cause is found in this), in others the end is in a part (*en merēi*) [sc. of a universal], viz. wherever division is into the indivisibles, as in the case of things to be done and things to be made; for it is in this way that their actuality exists.

The sameness by means of which we understand (*epistametha*) is sameness either in essence or in number or in form or in kind or by analogy, or by any other divisions [of sameness] that there may be besides these; but that by analogy spans the widest interval, as though there were here the greatest separation, this [appearance of separation] being due sometimes to ourselves, sometimes to the object, sometimes to both.

—Theophrastus, *Metaphysics* 8b10–9a91

David Balme has said that “the first difficulty in reading Aristotle’s biological treatises, as often in reading Aristotle, may well be to decide exactly what their purpose is. They are so factual and so comprehensive that it is easy to mistake them for descriptive information, an animal encyclopaedia, as the ancients regarded them.”² The same is true for Theophrastus. To understand a

text such as *Historia plantarum*, we need to be as clear as we can as to its purpose, and it is that task to which I set myself in this paper.

Theophrastus' botanical work has come down to us in two treatises, a *Historia* and a *Peri aitiōn*. Aristotle's zoological work, though encompassing more treatises, also comes divided into a *historia* and a set of studies of causes. We may be tempted to ask if the parallels between Theophrastus' and Aristotle's biological writings run any closer. Could *HP*, for instance, have been modeled on *HA*? If so, then the question of the purpose of either one of these treatises might usefully be studied in connection with that of the purpose of the other. That, at least, will be the strategy of this paper. I will argue for a view, new in some important respects, of the aims of *HA*, and then, turning to *HP*, show that this treatise *was*, so far as its distinct subject matter permits, modeled on *HA*. Finally, I will explore *HP* in some detail in the attempt to show that its aims, both long term and short, are much the aims of *HA*, even if Theophrastus is less sure, and less far along, in the pursuit of these aims in *HP* than Aristotle was in *HA*.

Though I will refer to each of the books of *HP* after the first, and to some of *CP*, it will not be possible in this paper to discuss these at any length. Instead, I focus on Book I which, like *HA* I, contains much more in the way of methodological remarks than the remainder of the treatise, and which also marks a significant break in the overall presentation. Similarly, we will restrict our attention to *HA* I-IV, to bring this vast text within manageable limits as well. Let us begin, then, with a careful and extended look at the question of the purpose or purposes of *Historia animalium* to set the question and then formulate the competing hypotheses for the *Historia Plantarum*.³

HISTORIA ANIMALIUM

The *Historia animalium* proper consists of nine books. Parts or all of several of these have been thought at one time or another to be spurious, but David Balme has recently shown them all to be substantially authentic, and I will proceed on that basis.⁴ *HA* is the largest treatise in the Aristotelian corpus, spanning 146 Bekker pages.⁵ As its title indicates, the treatise is a *historia*—an investigation, or the report of one.⁶ But what does an Aristotelian 'investigation' consist in?

The treatise appears, on its face, to be a massive collection of facts about animals, recording both personal observation and the reliable testimony of others. Its organization, if any, is less apparent. It has often been compared to natural histories, of the sort one still finds in the second-hand book shops: descriptive surveys, animal species by animal species, the species themselves grouped into larger kinds. D'Arcy Thompson, in the preface to his Oxford translation of *HA*, even translates its title as *Natural History*, and Benedict

Einarson, in the introduction to his Loeb edition, with G. K. K. Link, of the *De causis plantarum*, published in 1976, writes that “Aristotle first classified animals and gathered information about them in the *History of Animals*.”⁷ As *HA* does seem to group animals into larger kinds, and even speaks of *megista genē*, it has often been thought that it offers, or at least embodies, a taxonomy, a systematic hierarchical classification of the animal world.

Others, finding in the treatise much too little organization, have suggested that what we have are notebooks—file folders, in effect—of assorted information, perhaps aimed eventually at a taxonomic or natural history end. Some have had less patience. G. H. Lewes, writing in the mid-nineteenth century, while admiring the advance *HA* represented over anything that had appeared before, called it

an ill-digested, ill-compiled mass of details, mostly of small value, with an occasional gleam of something better. There is, strictly speaking, no *science* in it at all. There is not even a system which might look like science. There is not one good description. It is not an anatomical treatise; it is not a descriptive zoology; it is not a philosophy of zoology; it is a collection of remarks about animals, their structure, resemblances, differences, and habits. As a collection it is immense. But it is at the best only a collection of details, without a trace of organization; and the details themselves are rarely valuable, often inaccurate.⁸

But, in a seminal and justly celebrated paper read to the Second Symposium Aristotelicum some twenty-seven years ago, David Balme disputed this tradition.⁹ He argued that *HA* does not aim to offer us a taxonomy, nor does it contain or presuppose one; that it is not a natural history; but nor is it just a large notebook. Rather, it is a theoretical treatise, with a specific theoretical purpose and a highly specific organization. Professor Balme has continued to hold that general picture, but his view of the specific theoretical purpose has developed over the years, and it will be worth taking some time to review that development, as it will provide us with several possibilities for the theoretical purpose or purposes of both of our *Historiae*.

In this paper, published in 1961, Balme argued that while Aristotle’s logic and metaphysics advocated a method of systematic classification—via division, with *genē hup’ allēla*, and with *eidos* always a lower-level class, under a *genos*—the biological works (minus *PA I*) abandon this. These works, and in particular *HA*, make no use of division and offer no classification: *genos* and *eidos* are used interchangeably at all levels,¹⁰ and—decisively—one simply cannot find in these texts the sort of intermediate genera a taxonomic concern would entail. Virtually all the candidates for such which previous scholars had proposed, Balme showed to be what he came to call “differentiae-classes”—classes named descriptively, such as “the crook-taloned birds”, which fail to have enough properties in common to produce a true *genos*.¹¹ He showed Aristotle sensitive to this failure too.¹²

Against the natural history thesis, Balme observed first that *HA* is not organized animal by animal, and that facts about one animal are spread throughout the treatise (which, of course, had no index). Second, he noticed that Aristotle's reports are very selective—that he fails to mention many things he surely knows about a given animal, facts that we would expect to appear in a natural history.

What, then, is *HA*'s real purpose? What is Aristotle doing with all those differentiae? Balme observed that in the explanatory treatises, *PA* and *GA*, Aristotle "seeks the significant causal grouping of differentiae. . . . The method in fact is that which he briefly describes at *APo.* II 14, 98a14–19: by looking for those characteristics which are regularly associated one may detect their cause" (pp. 208–9). As for *HA*, Balme insists that we take seriously Aristotle's own statement of purpose at I.6 491a9: *hina tas huparchousas diaphoras kai ta sumbebēkota pasi labōmen*.

The *Hist. An.* does not so much describe animals as collect and analyse the differences between them. . . . The result is a collection of all observable differentiae, collected *qua* differentiae. The animals are called in as witnesses, taken primarily in the order in which the differentiae are taken and then (within that order) by *megista genē*. The purpose of such a collection is no doubt adequately explained by the passage referred to above: it was to be followed by a discussion of causes, 6, 491a10. (p. 212)

Balme concludes by suggesting that the classification of animals called for by the *Organon* and *PA* I would be somehow subsequent upon such a study of all the differentiae, but that "however that may be, if the *Historia* is read, not as an encyclopaedia nor as a collection of simple observations, but as being itself to some extent a theoretical treatise—namely a study of differentiae—, then much of its apparent incoherence disappears" (p. 212).

By the time Balme was asked to reprint this piece in *Articles on Aristotle* for publication in 1975,¹³ he had completed a close study of *PA* I.2–4 for his Clarendon Aristotle volume and had decided that the purpose of division was primarily definition, and only as a consequence classification.¹⁴ As Balme became more and more convinced that the logical treatises and the *Metaphysics* (and *PA* I) called for definition rather than classification, definition came to take a more prominent place in his mind as the ultimate purpose of *HA*. Such definitions would contain multiple differentiae, and they would include both causally prior and explained features, in the spirit of the definition in *APo.* II.8–10, whose terms are the same as those of the demonstration but in different order. Since the aim of these definitions, which *PA* I and various passages in *APo.* II (and elsewhere) say division helps to find, will be explanatory, they will be possible only *after* the causes have been identified. Thus *HA* is aimed at both causal explanation *and* definition.¹⁵

This view was briefly outlined by Balme in a paper read to the Southern Association in 1981, on "Aristotle's *Historia Animalium*: date and authorship,"¹⁶ and developed in more recent writings.¹⁷ There is an interesting twist in these papers, however—not anything entirely new, but a theme that moves to the foreground. Instead of speaking of *HA* as after "significant combinations of differentiae," Balme speaks rather of its aim of "identifying and analysing" the differentiae themselves. Whether one's aim is description, classification, explanation, or definition, the differentiae must first be identified and analyzed. I take the point to be that one cannot speak of the role of, say, viviparousness and oviparousness in animal life (or animal definition), until one has surveyed the reproductive processes that actually take place, and come to understand exactly what viviparousness and oviparousness are and the forms each takes (*GA* II, for instance, makes much of the distinction between internal and external viviparousness, which only a close look at animals would make one aware of). *HA* has this purpose, Balme now suggests, before it has the others already mentioned, though it has those as well. It will collect and analyze the differentiae, putting us in a position to give them exact definition. This will facilitate the identification of the significant associations and dissociations of differentiae, which itself will make discovery of causes, and thereby the establishment of causal definition, possible. *HA* itself contains only the first two steps: the collection and analysis of differentiae and their significant groupings; the others are left for other work. Such, as I understand it, is Balme's overall picture of both the immediate and the longer-range purposes of *HA*.¹⁸

I think this picture of the aims of *HA* is substantially right, but recent work by James Lennox and myself suggests an amendment. Professor Lennox and I think that in *HA* itself Aristotle takes the "significant groupings of differentiae" much further, and in a more systematic way, than Balme has suggested. In a paper that Lennox read to the Williamstown conference on Philosophical Issues in Aristotle's Biology in 1983, he observed that the *HA* statement of purpose from which Balme quoted, at 491a7–14, itself speaks of its connection to the *Posterior Analytics*, and that the latter work contains important clues to the (or, certainly, a primary) purpose of *HA*. The movement from "grasping the differentiae and attributes" to "trying to discover the causes," Aristotle says, is the "natural" (*kata phusin*) way to proceed in this inquiry, for: "it becomes apparent from [this *historia*] both *about which things* and *from which things* the *apodeixis* must proceed."

"*Apodeixis*" is of course a central subject of *Posterior Analytics*, and the expressions "about which things" (*peri hōn*) and "from which things" (*ex hōn*) are also standard *Posterior Analytics* terminology: the *peri hōn* is the feature whose possession by a subject one is attempting to explain; it turns up as a predicate in the conclusion of the explanatory deduction. The *ex hōn* is the

feature whose possession explains the possession of the former feature; it is the middle term of the deduction (*APo.* I.10 76b21–22).

The theory of *Posterior Analytics*, Lennox suggested, is lurking in the background.¹⁹ In a recent study, he has taken this further.²⁰ He notes Aristotle's concern throughout *Posterior Analytics* for producing explanations "at the right level". That is to say, if we are to exhibit the cause of a subject's possessing a feature, we must identify that subject at the proper level of generality. The attribute, Aristotle says, must be possessed by the subject "in virtue of itself" (in one sense of that multi-sensed expression); in fact, the attribution must be "primitively universal" (*APo.* I.4–5 *et passim*). Aristotle's most frequent example is the possession by isosceles triangles of an angle sum equal to two right angles. (Following Lennox, I will call this attribute "2R.") Isosceles triangles do not possess 2R in virtue of themselves—that is, in virtue of being isosceles, but in virtue of being triangles. After all, *all* triangles possess 2R, and no wider class of plane closed figures does. (Thus, going down the scale of generality, "triangle" is the *first* universal to possess the attribute.) It is the triangle that possesses 2R "in virtue of itself," "primitively universally," and it is that possession whose explanation must be sought. Finding that level, then, is a crucial step in the causal inquiry.

Lennox suggests that one can formulate the identification of the primitively universal level as a sort of explanatory syllogism. In canonical form:

2R belongs to every triangle.
Triangle belongs to every isosceles.

2R belongs to every isosceles.

Lennox calls this an "A-type explanation," and he distinguishes it from the "B-type explanation," the type Aristotle is ultimately after. The corresponding "B-type explanation" would have the form:

2R belongs to every M.
M belongs to every triangle.

2R belongs to every triangle.

Here, M would be the mathematical feature, derived from being a three-straight-sided Euclidean plane figure, which actually explains being 2R, whatever that feature might be.²¹ Such an explanation is the mathematician's goal, but he will not achieve it unless he has already brought the feature to be explained to the right subject level, and that is the task, when needed, of the "A-type explanation."

Now, in his paper, Lennox shows the pervasiveness of Aristotle's concern

for the proper level and his willingness to use “A-type explanations” to get us there. He observes that in one passage in *APo.* II.14, the chapter Balme noted as recommending the grouping of differentiae according to their association and disassociation, Aristotle identifies division as part of the method for getting us to that level, especially if we are coming down from a higher level of generality. Lennox goes on to show that Aristotle makes use of these “A-type explanations” in the biology’s explanatory treatises, but at the time of composing the Williamstown paper he did not have much to say about *HA*’s connection to this.²²

He and I subsequently, however, formed the hypothesis that one important function of *HA* is precisely to find, with respect to each of the animal differences Aristotle has collected, that right level at which causal explanation can take place—not to find the explanation, but the level at which it can be found. And in fall 1983 we began reading through *HA*, both separately, and at regular intervals together, to see if we were right. We think we are, and I would like to indicate some reasons why.²³ Let me note first some of the power and interest of this hypothesis of ours, that a primary aim of *HA* is to identify for each of the observable animal differentiae the widest class of animals (identified either by name or by other differentiae they possess²⁴) that possess that feature.

For one thing, it would substantiate, and carry further, David Balme’s claim that *HA* is a theoretical treatise, aimed at facilitating the discovery of causes. Balme has maintained that *HA* has as one of its aims the grouping of differentiae, but has not said much about the means and the extent to which it does that. We see the grouping being done by means of these widest-class generalizations, and find these generalizations systematically and pervasively developed throughout *HA*.²⁵

Secondly, it would make good sense of Aristotle’s claim that *HA* not only lays out the data, but allows it to “become apparent” what is cause and what effect. The widest-class generalization does not identify the cause, but it takes us beyond the simple laying out of differentiae and puts us in a crucially better position to do so.²⁶

Finally, the survey of my evidence for the hypothesis that a primary purpose of *HA* is the laying out of such widest-class generalizations will provide us a standard by which we can measure whether the *Historia plantarum* has as any part of its aim this same purpose.

Let us, then, have a look at the *Historia animalium*, and the case for this hypothesis.

As Balme has shown, *HA* is a study of animal *differences*. It runs for nine books. Book I opens with a review of the ways in which the parts—that is, tissues and organs—of animals can differ or be the same, then announces that “animals differ in respect of lives (*bioi*), activities (*praxeis*), and characters

(*ēthē*), as well as parts.” (“Activities” include cooling, keeping warm, procuring food, copulating, rearing young. “Lives”—or “modes of life,” “lifestyles,” as some now say—include habitat—being a land, water, marsh-dwelling or amphibious animal, for instance, and if land, living above or underground, in or not in a shelter; and sociability—living alone or in groups of various sorts—generally, perhaps, “activities in relation to environment, broadly construed.” Typically Aristotle refuses to discuss these two categories separately, speaking of “lives and activities,” or “the activities that make up the life.” “Characters” include degrees of intelligence, cunning, etc., and dispositions—fierceness, timidity, etc. These are not unconnected with activities and lives, as Aristotle notes, but he does distinguish them.)

These categories of difference are broken down into many more subcategories and given many more examples than my own illustrations suggest, and under “parts” Aristotle also reviews the sorts of parts that all or most animals must have, and their differences, proceeding, roughly, across soul-capacities, from nutrition to reproduction to sensation to locomotion. This review of differences takes five of our chapters.²⁷ Then follows, as chapter 6, the methodological discussion from which I have quoted, after which the main body of the treatise begins, in chapter 7. The main body divides as follows. Books I–IV, on parts; Books V–VIII on activities and lives (including generation); Book IX on characters. Though a full case for the “widest-class” hypothesis will have to include discussion of Books V–IX, I will focus in the present paper on the first section, the books on animal parts.

That methodological chapter in Book I—chapter 6—begins by identifying some commonly recognized large kinds of animals: birds, fish, cetacea—these, he notes, are all “blooded” (that is, red-blooded, pretty much our vertebrates). And among the bloodless (pretty much our invertebrates), there are the hard-shelled ones (clams, oysters, etc.), the soft-shelled ones (lobsters, crabs, etc.), the ‘softies’ (in Peck’s literalizing of *malakia*—octopi, squid, etc.), and the insects. Then to the blooded category he adds two groupings of his own, viviparous quadrupeds (our mammals less man) and oviparous quadrupeds (our amphibia and reptiles excluding snakes), which he argues are authentic *genē*. This is not an attempt at exhaustive taxonomy—he notes that groups like man and the snakes do not fall under any wider natural kinds, and that there are very few intermediate kinds, and later on he notes numerous animal forms that share features of more than one large group. But these large groups are true kinds (genera, not just “differentiae-classes”), in that members of each group share many features in common, with differences often just a matter of quantity or degree: “bird differs from bird by the more [and the less] or degree (one is long-feathered another is short-feathered),” he says elsewhere (*PA* I.4).

The subsequent discussion, in the main body of *HA*, treats blooded animals first, then bloodless. Within the blooded, he explores external parts first, then

internal. The external parts tend to be reviewed large kind by large kind. After man, as standard of comparison, come viviparous quadrupeds, then oviparous quadrupeds, birds, fish, and then snakes. This is repeated for the internal parts, though with them the tendency is rather to do it part by part, with kinds discussed within parts. This large kind by large kind review has often been appealed to as evidence of taxonomic and natural history concerns. But note first of all the division into external and internal parts. That takes precedence over the division into animal kinds. Furthermore, I said Aristotle “tends” to survey large kind by large kind. As I will illustrate in a moment, where he finds that a part transcends the subject class under consideration—say viviparous quadrupeds—he happily indicates the wider class (here, quadruped)—often, I will argue, the widest class (say, footed animal)—that possesses the feature. The division of animals into large classes here is a working one for convenience of achievement of his actual goals.

Now, as for our hypothesis regarding those actual goals, notice that if in fact one’s concern *were* with identifying the widest class possessing a given feature, on the assumption, say, that locating that would be a key to explaining the feature, then it *would* make great sense—i.e. save much time—to look at groupings already made on the basis of possession of many features in common. The induction from low-level animal forms has already been done, in the development of the language, or by previous study. From there one is in an ideal position to look across these large groupings to check for intergeneric features—which, Aristotle thinks, will often be there, frequently as analogues, though not nearly so frequently as there will be differences.

A closer look at Aristotle’s text confirms, I think, that at least one main purpose of *HA* is to identify the widest class that possesses the feature under discussion. My own examination of the text of *HA*, even of the first four books, is by no means complete—this is a report of work in progress—but it strongly suggests the correctness of this “widest-class” hypothesis. One could group the evidence into five categories. No one piece of evidence or argument by itself will be conclusive, of course, but taken together they are impressive.

- (1) The large-kind-by-large-kind surveys throughout *HA* make good sense on this hypothesis, as I have already explained.
- (2) More strikingly, as I have hinted, the departures from kind-by-kind survey—the transgeneric generalizations—make good sense too.
- (3) There is a piece of linguistic evidence, a peculiar form of words common to quite a few generalizations Aristotle reports in these chapters, which once in a while confuses translators. This form of expression seems nicely explained by the hypotheses under consideration (though I hasten to acknowledge that weaker hypotheses could accommodate it also).
- (4) There is the structure of the discussion of features common only to some

members of a large kind, where widest-class generalizations seem very much what is aimed at.

- (5) There is a natural account one can give of the frequent enough passages that are clearly not identifying widest subject classes, which makes these passages natural parts of an endeavor in which the overall purpose is precisely to arrive at such subjects.

I have already said something about the first two categories. In the remaining space I can devote to *HA*, I will just illustrate the claims I have already made and then go right on to the other three categories of evidence.

(1)&(2): After the introductory chapters I have already summarized, Aristotle begins the main body of *HA* with a careful and systematic delineation of human external parts—top to bottom—which by virtue of their greater familiarity can serve as a standard of comparison and an aid to not missing anything in the other animals. The internal parts, by contrast, are more familiar in the *animals*, and beginning with the blooded animals, he again proceeds from top to bottom. The delineation of parts precedes the kind-by-kind survey. The latter begins at the start of Book II, where Aristotle takes up external parts—and first in viviparous quadrupeds. The opening words of Book II are:

Some of the parts of animals are common to all, as we said earlier; some only to certain kinds, and the ways in which they can be the same as or different from each other we have often stated.

The subsequent discussion, though focused around viviparous quadrupeds, ranges over features common to wider classes of animals as well, sometimes quadrupeds generally, sometimes footed animals generally, sometimes viviparous quadrupeds and man—for example, in the possession of hair, though Aristotle focuses on the differences between viviparous quadrupeds and man in this respect.

After hair, Aristotle moves to legs and feet, another external feature by which viviparous quadrupeds differ from other animals. Here (499a31) he moves right to the quadrupedal level, then immediately further up, as follows:

All quadrupeds have legs which are bony, sinewy, and fleshless. So too have all footed animals, apart from man. Also, they lack buttocks—this absence is even more marked in birds. With man the reverse is true: his buttocks, thighs, and calves are pretty much the fleshiest parts of the whole body.

Apart from gross bodily configuration and number of legs, there is not a whole lot all and only viviparous quadrupeds have in common. Most of their common features are internal. The chapters on birds and fish, on the other

hand, offer good examples of descriptions of features all and only birds—or all and only fish—have. In the chapter on birds, for instance:

In some of their parts birds resemble the animals we have just been discussing: they all have a head, neck, back, underside, and a counterpart of the chest. They have two legs, like man—in this respect resembling him more than any other animal does—except that birds bend their legs backwards, like quadrupeds, as we remarked earlier. Birds have no forefeet or hands, but wings—a peculiarity distinguishing them from other animals. Their haunch-bone is long, like a thigh, and attached to the body as far as the middle of the belly: the result is that when taken separately it looks as though it is a thigh, although the thigh is actually a different part, extending from it to the shin. . . . All birds have numerous claws, and all in one way or another have numerous toes. . . .

Birds have a mouth, but a peculiar one: they have neither lips nor teeth, but a beak. They have no ears or noses either, but passages serving these sensory faculties: the passages for the nostrils are in the beak, those for hearing in the head. . . .

Furthermore, birds have neither horny scales nor hair, but feathers, and the feathers always have quills. Birds have no actual tail, but a rump. (*HA* II.12 503b29–504a6, 19–23, 30–32; tr. Peck)

So much for our first two categories.

(3) The discussion of teeth in viviparous quadrupeds leads us to our third category of evidence: the linguistic form in which Aristotle often reports his findings. He begins (501a8):

With regard to teeth, the animals exhibit great differences both from each other and from man. For whichever are quadrupeds and blooded and viviparous, all have teeth, but to begin with some are dual-toothed [i.e. toothed in both jaws], others are not. For, whichever are horned are not dual-toothed.

In the discussion of the parts in birds, Aristotle notes that: “Whichever birds rise well into the air, all have four toes” (504a8–9). Several pages later he opens his survey of internal parts of blooded animals by noting that: “Whichever animals are quadrupedal and viviparous, all have an esophagus and a windpipe” (505b32–33). And so on. Whichever are X, all these are Y. In Greek, *hosa* X, *panta echei* Y.

This redundant use of quantifiers is rare outside the biological works (and less frequent in the biological works outside of *HA*), and though it could be just a quirk of style, it suggests to me a concern with levels of generality. The *hosa* typically picks out a subclass of some wider class and *suggests*—though it by no means entails—that *only* this subclass has, or is known to have, the feature. I stress “does not entail” for two reasons. First, the separative force of *hosa* can simply be directing our mental attention to the subject class, as if to say, “Focusing now on X, all have Y.” Second, even when we distinguish our subject class from a wider class the rest of which does not have the feature

(imagine, for instance, that no other quadrupeds had teeth), that would not rule out yet another class (say, fish) from having the feature.

Still, the redundancy of the quantifier suggests to me a focus on finding universal propositions, at a reasonably high level of generalization. The *hosa* propositions *are* often convertible, and if not are ripe to serve as premises for so-called perfect induction to that desired level. By itself, this usage would not count for much, but together with the rest of the evidence, it is strongly suggestive.

Now, Aristotle's interest is of course not only in features common to very wide classes, but also in the way subclasses of these kinds differ from each other—the bulk of *HA* in fact is devoted to differences at the intermediate and lower levels—which brings us to our fourth category of evidence.

(4) Aristotle is particularly interested in exceptions to broad generalizations, for the reason, as David Balme has also suggested, that they imply other differences at that same level, correlated causally with these. For instance, in the chapter on external parts in oviparous quadrupeds, II.10, Aristotle writes:

[They] . . . have a head, neck, a back, under and upper parts, also front and hind legs and an analogue of the chest, just as the viviparous quadrupeds do [—note the move to the wider class with regard to these external parts], and most of them have a fairly large tail, though a few have a smallish one. All of them are polydactylous, i.e., their feet are many-cloven [split into many digits]. In addition they all have sensory organs including a tongue, except the Egyptian crocodile. (502b28–503a1)

This distinctive feature of the crocodile might imply that there is something unique to it which explains that feature's presence, but note the interesting twist:

In this respect it resembles certain fishes: for generally speaking, the tongue of fishes is prickly and not properly separate, while some fishes exhibit in that position a quite smooth and unarticulated surface unless you pull their mouth well open. (503a1–5)

In the *Parts of Animals*, Aristotle offers a two part functional explanation for the crocodile's situation, one part of which depends on certain resemblances to fish, one part on something unique to the crocodile (*PA* II. 660b11–34). Reaching these explanations is much aided by knowing at what subject level or levels to look for the explanation, and our suggestion is that finding those levels is a major part of Aristotle's purpose in *HA*.

Again, in the chapter on external parts in birds, II.12, after some lines on features uniquely common to birds, he introduces his first set of differences among these animals:

All birds have numerous claws, and all *in one way or another* have numerous toes: in most birds the toes are quite distinct, and the swimmers, although web-footed, have separately articulated toes. Whichever birds rise well into the air, all these have four toes; most of them have three toes in front and one behind, instead of a heel: a few have two in front and two behind such as the bird called the wryneck. (504a5–12)

The wrynecks are thus fairly peculiar. Often, on noting a peculiarity, Aristotle goes on, as he does here, to describe other peculiarities of the class under discussion. He does this with the elephant and the camel, for instance. Once again, on the “widest-class” hypothesis this makes perfect sense: the explanation for a peculiarity is likely to be found on the level of that peculiarity.

But Aristotle is interested not only in exceptions, but in variation—difference—quite generally. After a few more lines on features uniquely common to birds—the beak, and feathers—he goes on:

Birds have no actual tail, but a rump: the long-legged and web-footed birds have a short one, the others a long one. The latter fly with their feet close up under their belly, whereas the small-rumped birds fly with their legs stretched out. (504a31–35)

Here again are correlations. Among birds, all and only long-legged and web-footed ones have a short rump and fly with their legs stretched out. This does not give us the explanation for any of these features, but it does put us in a better position to do so, and in Aristotle’s explanations in *PA* (694b12–25) these features *are* causally connected.

(5) My final category of evidence encompasses a range of apparent exceptions to our hypothesis, namely the many passages in *HA* where Aristotle is not, so far as I can see, offering widest-class correlations. What else might he be doing, compatible with that being his wider project or aim?

Here I will have to be brief, but notice first that in order to find the widest subject class possessive of each animal feature, one must first have the features before one. Thus, sometimes, I suggest, Aristotle is just listing features possessed by some readily observable class, not yet having asked what the widest class possessive of that feature is. Sometimes he has already moved to a higher level—all fish of a certain type have a certain feature, say—but he has not yet looked to see how many other fish, or even non-fish, have it as well.

Sometimes there seems to be an allusion to the wider class, without it being said how wide the class is, as with the pervasive possession of heads, mentioned in several of the passages I have quoted. It would be no surprise if Aristotle has not yet decided how wide the class is, since he rightly finds it a tricky question as he moves down toward and into the bloodless animals. Alternatively, he might be perfectly clear how wide the class of headed animals

is, but have planned to discuss it when he got to the bloodless cases: sometimes he discusses features at places one may not quite have expected, as he might well discuss what it is to be a head—and thus how wide the class of headed animals is—when he talks about sense organs. This is a made-up case. I have not stopped to look at how he actually handles heads, but the possibilities are clear, and they go a long way toward explaining the apparently exceptional texts.

Also, as I have mentioned earlier, *HA* is a work in progress, and quite long as it is, thank you. It is no surprise then if things one might expect him to say are omitted, especially as *HA* is probably a set of lecture notes, or study reminders, fillable in as needed.

This, incidentally, points up the core of truth in the notebook hypothesis discussed earlier. *HA* has a basic structure, I have been arguing, a specific organization for a specific theoretical purpose. But within that structure Aristotle is clearly adding information as he acquires it. David Balme's current work on *HA* (cf. above n.2) has established that the collection and organization of the information that constitutes *HA*, though substantially by Aristotle after all (including *HA* VIII and IX), and substantially established during his middle period, was added to throughout the rest of his life.²⁸

Some caveats, though. One feature of *HA*, on which Balme has much commented, is the selectivity of its reports: Aristotle's descriptions, even in the preliminary, as yet undistributed, reports (above n.28), are highly selective. Much that he surely has observed is not stated. I have suggested ways in which one might explain what is present and what is not, and much that is left out might well be features that are covered by generalizations already made about some wider class under which the animal in question falls. But until one can tell a full story that makes thoroughly natural and unproblematic both what is present and what is absent in *HA*, one cannot be fully confident of one's hypothesis. More generally, we need to walk this interpretation, in all its ramifications, line by line through *all* of *HA*, and then *run* it through, so to speak, to be sure it fits the *spirit* of the whole as well. While I aim to do this over the next couple of years, I have not done so yet. Still, I do believe the evidence offered here, and in James Lennox's papers (above n.23), makes it unquestionably clear that our "widest-class" hypothesis is at least one part of the full picture, and I offer it in that spirit.

HISTORIA PLANTARUM

Diogenes Laertius reports a *Peri phutikōn historias* in ten books. Our *Peri phutōn historias* is in nine, perhaps, scholars have argued, because the ancient division was different, perhaps because a book was lost.²⁹ *HA* is in ten, or nine books. Do the affinities stop there, or was *HP* perhaps modeled after *HA*?

HA begins abruptly with a distinction between homoiomerous and anhoiomerous animal parts and a discussion of the various ways in which animal parts may be the same as or different from each other. This has appeared so abrupt to some commentators that they have wondered if the passage did not belong later in the treatise,³⁰ especially since if one moved it, Aristotle's first words would then be expressive of the treatise's focus and structure, as follows:

hai de diaphorai tōn zōiōn eisi kata te tous biōus kai tas praxeis kai ta êthē kai ta moria, peri hōn tupōi men eipōmen prōton, husteron de peri hekaston genos epistēsantes croumen.

Differences in animals are with respect to their modes of life and their actions and their characters as well as their parts, concerning which let us first speak in outline, and later discuss with attention to each kind [*sc.* of difference under these four heads]. (Transl. mine.)

Here are the opening words of *HP*:

tōn phutōn tas diaphoras kai tēn allēn phusin lepton kata te ta merē kai ta pathē kai tas geneis kai tous biōus. êthē gar kai praxeis ouk echousin hōsper ta zōa. eisi d' hai men kata ten genesin kai ta pathē kai tous biōus eutheōrētoterai kai rāious, hai de kata ta merē pleious echousi poikilias.

In plants the differences and their nature generally must be understood with respect to their parts and qualities and modes of generation and modes of life; for characters and actions they do not have as animals do. Now, while their mode of generation and qualities and modes of life are more discernible and easy to understand, differences with respect to parts can be very complex. (Transl. mine.)

The parallel is striking, and it does not end there. Like *HA*, *HP* gets its broad structure (at least initially) from this initial division of differentiae. We will review that structure and its parallels or lack thereof to the overall structure of *HA*, but it is worth noting first some other close parallels in the first book. Then, after a look at the overall structure, we will turn to the question of the purpose of *HP*.

Theophrastus continues (from where the above quotation left off) by exploring an *aporia* concerning what counts as a "part." What that difficulty is is not important for our purposes, but his way out is:

But perhaps we should not expect to find in plants a complete correspondence with animals in regard to those things which concern reproduction any more than in other respects. (I.1.3; repeated at the start of I.1.4)³¹

As in the opening passage just quoted, this has the ring of announcing a departure from a standard practice, and a long passage in I.2.3–4 makes it clear that (and why) a comparison with animals will be standard:

Fibre and 'veins' have no special names in relation to plants, but, because of the resemblance, borrow the names of the corresponding parts of animals. It may be however that, not only these things, but the world of plants generally, exhibits also other differences as compared with animals: for, as we have said, the world of plants is manifold. However, since it is by the help of the better known that we must pursue the unknown, and better known are the things which are larger and plainer to our senses, it is clear that it is right to speak of these things in the way indicated: for then in dealing with less known things we shall be making these better known things our standard, and shall ask how far and in what manner comparison is possible in each case.³²

Most of the facts about animals with which those about plants are compared or contrasted are commonplaces, and do not necessarily reflect a careful study of *HA*, much less a borrowing of its structure, but the terminology is consistently Aristotelian, as is such doctrine that is not commonplace, and both of these reflect affinity of general theoretical approach. Other passages more clearly suggest a modeling after *HA*.

The passage that immediately follows the resolution of the *aporia* about parts identifies several general ways in which parts may differ, and Theophrastus says in abbreviated form (*hōs tupōi labein*: I.1.6) much the same things, frequently in much the same words, that Aristotle says in the opening passage of *HA*.³³

This opening passage of *HA* is followed by the sentence I quoted above, after which Aristotle outlines the *bioi kai praxeis* and the *ēthē* that he expects to study in more detail later.³⁴ This is followed, in chapters 2–5, as I mentioned earlier, by a survey of the more common parts of animals proceeding soul-faculty by soul-faculty. In chapter 6 Aristotle identifies the *megista genē* into which animals are divided, notes difficulties for any comprehensive classification scheme, gives a brief statement of purpose, and explains why he will use man as the standard in surveying the external parts. Chapter 7 begins the survey as follows:

megista men oun esti tade tōn merōn eis ha diaireitai to sōma to sunolon:

Now, these are the main parts into which the body as a whole is divided:

Theophrastus does not survey the *geneseis*, *pathē*, or *bioi* he expects to discuss, but turns directly to parts, with the words:

auta de ta merē diarithmēsamenous peirateon peri hekastou legein. esti de prōta men kai megista kai koina tōn pleistōn tade:

Let us try to give a delineation of the parts themselves, speaking about each. First and main and common to most are these: (I.1.9; tr. mine)

He begins with the visible parts, “regarding them as members corresponding to the members of animals” (“members”: *melē*; cf. *HA* 486a8–13)—root, stem, branch, and twig. From there he moves to “the things of which such parts are composed, namely bark, wood, and core . . . , and these are all *homoioimerē*” (I.2.1; *HA* begins with a distinction between *asuntheta*, “which divide into *homoioimerē*” and *suntheta* “which divide into *anhomoioimerē*”). Theophrastus continues the analysis down to the elementary powers, bringing in a variety of parts-related features on the way, showing for instance that various *pathē* and *dunameis* (e.g. being easily splittable) are due to features of the plant’s constituents.

Ready now (I.3.1) to state the actual differences between parts of plants in these various ways, Theophrastus observes that this study (*mathēsis*) will proceed more easily if we divide according to forms (*diairoumenon kata eidē*) wherever possible. Then he says:

prōta de esti kai megista kai schedon huph’ hōn pant’ ē ta pleista periechetai tade, dendron (‘tree’) *thamnos* (‘shrub’) *phruganon* (‘undershrub’) *poa* (‘herb’).³⁵

And Theophrastus too spends some time (I.3.2–6) discussing the limitations of this, or any, attempt to produce a comprehensive classification of the plants. (Theophrastus, more it seems than Aristotle, is bothered by *epallaxis* even with respect to differentiae themselves,³⁶ and he continues on about this through chapter 4.)

The parallels, in short, are overwhelming, and there cannot be any question but that Theophrastus had *HA* before him as a model for his work so far as his distinct subject matter permitted it. How close, then, did he follow *HA*? We see that though the tools are much the same, the strategies of deploying them are somewhat, though not terribly, different. What about the overall structure of the two treatises? A brief look at that will put us in a position to explore *HP*’s purpose.

HP I, as a whole, seems to correspond to *HA* I–IV. It is, as they are, concerned with parts (containing on the way various methodological remarks that bear on the entire enterprise). *HP* II–III, like *HA* V–VII, seem to focus on *geneseis*—modes of generation, including types of spontaneous generation, the effects of cultivation as against germination in the wild, and so forth. In Book IV Theophrastus turns to trees typical of, or peculiar to, various regions, themselves usually distinguished by their climates. This seems to mirror in

certain ways some of Aristotle's discussions in *HA* VIII and IX, and to fall under *bioi*. Theophrastus, like Aristotle, includes a review of the sorts of diseases various organisms are subject to, probably because these reveal something about the organism's nature.³⁷

HP V, which "endeavour[s] to speak of timber (*hulē*), saying of what nature (*poia*) is that of each tree, what is the right season for cutting it, which kinds are hard or easy to work, and anything else which belongs to such an inquiry (*historia*)" (V.1.1 *init.*), might strike a reader of *HA* as peculiar: should *HA* have discussed the types of meat that different animals provide, "and which kinds are hard or easy to work"? But, as David Balme has pointed out to me, the answer would be yes *if* such an investigation revealed facts about the nature of those animals not best revealed any other way, as Theophrastus apparently thinks is the case for wood (and perhaps makes clear at I.5.4–5, where he states that the various *dunameis* of plants belong to their nature, in that they have these *dunameis* because (*dia*) of certain features of their material makeup).

As I mentioned twice before, Aristotle's survey of the differences among the external parts of animals began with man: "Every nation reckons currency with reference to the standard most familiar (*pros to . . . gnōrimōtaton*) to itself; and we must do the same in other fields: man is, of necessity, the animal most familiar to us" (*HA* I.7 491a20–23; tr. Peck). For Theophrastus the standard is provided by trees—the *genos* of plants most familiar to us, and they get primary attention (along, to a lesser extent, with shrubs) in the first five books: "However, as has been said, these characters belong especially to trees, and our classification of characters (*merismos*) belongs more particularly to these; and it is right to make these the standard (*pros ha . . . tēn anaphoran*) in treating of the others" (*HP* I.1.11).

In Book VI Theophrastus begins his look at the remaining *megista genē*, undershrubs and herbaceous plants (including grains), and this continues through Book VIII. One difference from *HA* is that while Aristotle firmly structures the work by differentiae, reviewing the *megista genē* once for parts, again for generation, and again for modes of nutrition and characters,³⁸ Theophrastus tends to discuss, for the under-shrubs and herbs, parts and generation together.

Book IX is about the "juices" (or better, the fluids—the moisture, sap, etc.) in plants; the tastes plants have; and the medicinal use of herbs. Taste and degree and kind of moisture were mentioned as differentiae in Book I (chapter 12), where the latter explicitly (and the former, perhaps implicitly) was said to derive from (and therefore be indicative of) the peculiar blend (*krasis*) or elemental mixture (*mixis*) which constitutes the material nature of the plant (as is surely true as well for its medicinal power, where it has any). The book thus takes its place in *HP* and, at least in the text as we have it, brings it to a close.

What can we say in general? Aristotle has structured *HA* almost entirely around features (parts, activities, lives, characters), with groupings by *megista genē* only under these features, with rare exceptions that are explainable as early stages in the production of such a structure. Theophrastus' structure seems, to this reader at least, less sure. As just mentioned, in the case of the less familiar *megista genē*, he tends to group all differentiae of a *magiston genos* together under that *genos*, though he has said *explicitly* (where we have had to infer it, against the tradition, in the case of Aristotle) that the groupings in terms of *megista genē* are only for the purpose of facilitating the study of differentiae. Now, what appears to me as unsureness may be just that, a sign of an inability—either an inability to master the material, shaping it to the intended structure, or an inability fully to master the theoretical structure itself, not completely surprising even in the brightest of inheritors of a once hard-won approach, now taken for granted. Or, it might be a sign simply of *HP*'s being an earlier stage in Theophrastus' work than *HA* was in Aristotle's.

Alternatively, though this is less likely, there may be some theoretical purpose in doing it that way, just as Aristotle appears to have one in discussing the external then internal parts of each bloodless kind together under the kind, rather than surveying the external parts of each kind first, and then the internal.³⁹ Finally, the structure might be cleaner and clearer than I am making out, its invisibility due simply to my relative unfamiliarity with the full text of *HP*.⁴⁰ But whichever it is, it seems clear to me that Theophrastus is working at least within the same broad theoretical structure as Aristotle, and that we can expect the broad theoretical purposes of the treatises to be much the same, or at least in the same methodological ballpark, though we might well find differences of emphasis. What, then, can we say about the purpose of *HP*?

With *HA*, as we recall, we distinguished an immediate and a more ultimate purpose. The immediate purpose, as Balme established in 1961, and which there has never been reason to doubt, is, as he put it, "a collection of all observable differentiae, collected *qua* differentiae. The animals are called in [only] as witnesses, taken primarily in the order in which the differentiae are taken" (above p. 103). *HA* is neither taxonomy, nor natural history, nor "a rag-bag of observations," as Balme in 1961 put one view he was criticizing. The more ultimate purpose of that collection has been, for Balme, "the significant causal grouping of differentiae" and thereby the discovery of causes, and ultimately, or in the process, the explanatory definition of animal kinds (however exactly the form, and object(s), of definition are to be understood). Lennox and I have argued that this grouping of differentiae occurs in the form of "widest-class generalizations" and is in fact part of the immediate purpose, being typically the very *form* in which the "collection of observable differentiae" is presented. This entails that the discovery of causes is

certainly an essential part of any more ultimate purpose of *HA*, though it of course does not exclude any wider purpose, such as definition.

So there are two levels at which we can ask the aim of *HP*—its immediate purpose and its more ultimate one. Let us start with the immediate purpose. First, as we have seen, there is clearly a structure to *HP*, even if it is not as luminous, or as consistently articulated as *HA*'s structure is in it. No "rag-bagger" Theophrastus.

Theophrastus, more firmly even than Aristotle, seems to reject the possibility of any rigorous classification scheme, and (though this deserves a more careful examination than I have given it) his biological corpus, like Aristotle's, is largely free of intermediate genera. There is, in short, no sign even of an ultimate, let alone an immediate, taxonomic aim. A mere natural history? A quick review of the structure of *HP* will make clear that it is not, that Theophrastus has not grouped his material by plant type.

Books I and II–III, as we have noted, treat parts and modes of generation, respectively, and even within these units, the division is by differentiae. Consider, first, the structure of Book I from the point where we left off with it earlier. As we saw, the book begins with a division of plant differentiae into parts, *pathē*, *geneseis*, *bioi*; resolves a difficulty in what we are to count as "parts"; offers an *arithmēsis*, with preliminary definitions, of the major parts, noting that trees are to be used as the standard for those in other plants, followed by an *arithmēsis* of the constituents of these parts, down to the elementary powers. Theophrastus then suggests that a division of plants into *megista genē* will be useful toward his end, and provides one, urging however that this division, and in fact all the divisions of plants by one or another pair of major differentiae, is only approximate, though still natural and scientifically important. That is where we left him.

At this point (I.4.1), Theophrastus incorporates into the discussion of parts discussion of a plant's physical form (*morphē*), here meaning overall presentation, that is, its shape and those features it possesses as a whole (or throughout the whole of itself),⁴¹ thereby completing the list of differentiae (here: parts and *morphai*) to be discussed. We are then (I.5.1) told that:

Next we must try to give the differences as to particular parts, in the first instance speaking broadly of those that are universal, and then of special differences between individual kinds; and after that take a thorough look more widely.⁴²

And so the remainder of the book proceeds. We get a full survey of the differences (sometimes labeled divisions) and subdifferences, with at least one example for each difference of a tree or other plant which possesses it, which Theophrastus has found or noted in cores, roots, knots, direction and pattern

of growth, leaves and their composition, seeds, taste, shape, and the whole form (*hē holē morphē*), degree and kind of plant moisture, miscellaneous others (downy-ness, leafiness, etc.), flowers, and fruit production, concluding with a general account of differences that apply to a plant as a whole.

Books II–III appear organized in much the same way. The focus is methods of propagation, and related facts about generation, and plant-types are brought in only or largely as examples, except where those exemplary types are sufficiently unfamiliar to require some identificatory description, or where a familiar type has subtypes which, though not usually or easily distinguished, require distinguishing here because some aspect of the mode of generation is different in each.⁴³ And even in the later books where, as I have noted, almost all the differentiae of the under-shrubs and the two types of herbaceous plants are treated together, the review within that discussion, after the initial division into subkinds, seems from a quick look to be substantially by differentiae or at least struggling toward such.

HP is not, then, organized by plant type, but by difference, as is *HA*. In fact, while the word *diaphora* appears only a few times, I think, in *HA* I, and there is only that one statement of purpose that involves it,⁴⁴ *HP* I is riddled with the word, with some form of it appearing almost once a Loeb page of Greek, and surely more than once a page if one includes forms of *diairein* and *diairesis* (which nearly always imply “of differentiae”). And it abounds in statements of immediate purpose or subpurpose. Consider:

- I.1.1 (opening words): “In considering the differences of plants and their nature generally”⁴⁵
- I.1.6: “Now the differences in regard to parts, to take a general view (*hōs tupōi labein*), are of three kinds”
- I.2.2: “Let these things be divided then in this way.”⁴⁶
- I.5.1: “Next we must try to give the differences as to particular parts, in the first instance speaking broadly of those that are universal and common, and then of special differences between individual kinds; and after that take a thorough look more widely.”⁴⁷
- I.14.5 (final words of Book I): “However we have said enough for study of the differences between parts and between general characters. We must now speak of the methods of growth, for this subject comes naturally after what has been said.”⁴⁸

So, *HP* is in its immediate purpose a collection, an analysis, of differentiae. But what is its more ultimate purpose? What is the survey of differentiate *for*? Causes? Definitions? Differentiae for their own sake, with no further purpose (“The man just liked plants . . .”)?

Arthur Hort, the Loeb editor and translator, seemed to have thought the

purpose was “the principle of classification”—that is, the idea of defining the true nature of the real objects in the world. This had begun with Plato, and was absorbed by Theophrastus:

Throughout his botanical works the constant implied question is “What is its *difference*?” “What is its essential nature?”, viz. “What are the characteristic features in virtue of which a plant may be distinguished from other plants, and which make up its own ‘nature’ or ‘essential character’?”.⁴⁹

Hort says nothing of causes, not even of how their investigation might serve definition. Benedict Einarson, in his introduction to the Loeb *De Causis Plantarum*, says that the aim is the discovery of *causes*, but he says nothing about definition of essential nature:

Theophrastus first classifies and identifies plants and gathers information about them in the *Historia Plantarum*, then proceeds to account for certain common or distinctive characters in the *De Causis Plantarum*.⁵⁰

What does Theophrastus himself say? While *HA*’s one statement of immediate purpose is followed directly by a statement of more ultimate purpose (“to try to discover the causes”⁵¹), *HP*’s many avowals of concern for *differentiae* say little of the use to which the survey might be put, though it is certainly clear that some further use is in mind. Consider again, for instance, the closing words of Book I:

However, we have said enough for study (*theōrein*) of the differences between parts and between general characters. We must now speak of the methods of growth, for this subject comes naturally after what has been said.

More literally, the first of these sentences reads:

However, we must [go on now to] try to study the differences of the parts and of the wholes themselves *from these things*.

But “these things” *are* the differences that have been studied across Book I.⁵² That suggests that the present study of differences is to be followed by another study of these differences that is to be built on the present study. And this is most likely to be the study of causes. Consider the following passage:

I.3.6: ‘Nevertheless, we are bound to use such distinctions.⁵³ For there is a certain common character alike in trees, shrubs, undershrubs, and herbs.⁵⁴ Wherefore, when one mentions the causes also, one must take account of all alike, not giving separate definitions for each class (*ouch horizonta kath’ hekaston*), it being reasonable to suppose that the causes too are common to all.⁵⁵

This passage is speaking to the value of the division into *megista genē*, and the broad divisions of *differentiae*, notwithstanding the fuzzy edges, and suggests that this division will play an important role in the exposition of causes, quite in the spirit of Aristotle's insistence that explanation be at the right level, discussed above.⁵⁶ (I will come back to the mention of definition very shortly.) It seems to suggest that a causal inquiry will follow the study of *differentiae*, and it suggests that at that point we will need something like our "widest-class generalizations." And it does seem to announce that we are to do certain things now that will put us in a position more easily to secure them. However, the passage does not clearly say that the entire thrust of the current enterprise is to enable us better to seek causes, as Aristotle in fact seems to say of his *historia*.⁵⁷ The same seems true for a second passage that mentions causes, in fact final causes:

Now the nature of the major parts has been discussed already—I mean such parts as the root, the stem, and the rest. Their functions and those things for the sake of which they each are will be discussed later.⁵⁸

Theophrastus has just digressed from his enumeration of the major parts of plants and their constituents to make a methodological point, which leads him to observe that his next step after this enumeration will be to discuss the differences of these parts, a discussion he says (in a passage we will look at in a moment) which will make clear their basic natures. About to resume the enumeration, it seems to occur to him that someone will wonder where the inquiry into causes fits in. It seems clear from the brevity of the mention that his listeners would take for granted that a causal inquiry belongs somewhere in all this, but perhaps would not be certain where. That seems to suggest, again, that the present inquiry will be followed by a causal one, but again does not make clear that the former one is for the sake of, or directed immediately at, the latter.

The two passages just discussed are, I think, the only ones in *HP I* that mention an inquiry into causes. Now an inquiry into the causes of plant features has come down to us, and one might wonder if that is not the inquiry referred to, and if it might not contain any clues as to the purpose of *HP*. Strangely, the answer to the first question seems to be no. Both these passages speak of an inquiry into the causes of *parts*, and so far as I can see, there is no such inquiry in *CP*. *CP* is rather an inquiry into plant *generation*, roughly on the model of Aristotle's *GA*, and a much more accurate title of *CP* would be *De Generatione Plantarum*. *CP* discusses parts only so far as they bear on generation, as *GA* itself does (and announces itself, in its opening words, as doing).⁵⁹ Nowhere in *CP* does Theophrastus take the differences in *parts* laid out in *HP I* and ask why *these* plants, for instance, have this type of root, and

those that type, telling us thereby “what its function is and that for the sake of which it exists,” as Aristotle’s *PA* does relentlessly for animal parts. *CP*—more properly “*GP*”—may well have been intended as the first in a series of inquiries which was eventually to contain the nonexistent “*PP*” (“*De Partibus Plantarum*”). My overall impression even of *HP* alone is that Theophrastus had a special preference for generation. It must be left for a separate discussion to what extent the causal inquiry into generation makes use of the laying out of differences in *HP* IIff., and to what extent the manner in which they have been laid out in *HP* is geared particularly to the explanations in *CP*. As for *HP* I, there are very few “widest-class generalizations” to be found there.⁶⁰ For the most part, the review is *differentia* by *differentia*, and if a widest-class inquiry is a stage in the overall study, it is a stage well down the road, as the first of our two passages just above suggests.

Is *HP* then more immediately a study of definition? It was the connection between the opening of *HA* and the discussion of definition by division in *PA* I.2–4 which led David Balme to see definition as a primary purpose of *HA*. The *PA* passage argued that division should begin with a natural *genos*, *eidē* of which differ primarily in “the more and the less” (and gave as examples some of those listed as *megista genē* in *HA* I.6), taking its multiple *differentiae* all at once and dividing simultaneously and successively, that is by further specification of the “mores or lesses” of those initial *differentiae*, tying the distinction between *eidos* and *genos* to the distinction between sameness differing only in more and less and sameness only by analogy. The opening passage of *HA* introduces this apparatus of levels of sameness and difference, elaborates on the notion of “the more and the less,” and proceeds, at great length, to collect all the *differentiae* Aristotle can find—for the purpose, Balme inferred, of producing such definitions by division.

Has *HP* that tie to the *PA* theory? As we have seen, Theophrastus does introduce early on differing ways of being the same and different, and makes significant use of the notion of analogy. But the tie to the notions of *genos* and *eidos* seems less in evidence, and no mention is made of definition. What Balme had observed about *HA* was at least equally true of *HP*: division is nowhere used for definitional purposes, and no definitions by division of plant kinds are produced. As we have noticed, there are frequent divisions of *differentiae* in *HP* I (as there are throughout *HA*)—of roots, some are woody, some fleshy, some are both, etc.—but all in the service simply of laying out the *differentiae*, not of defining anything. Nor does it seem to me that even down the road is the definition of plant kinds or forms a distinct purpose of *HP*. There are a few passages in *HP* I that might seem to suggest this, however, so we had better have a brief look at them.

In the lines that immediately precede the reference to the final cause quoted

just above,⁶¹ in the midst of his overview of plant parts and their constituents, Theophrastus reflects on his project:

And when we have taken the parts, we must next take the differences which they exhibit, for thus will their essential nature become plain, and at the same time the general differences between one kind and another (*houtōs gar hama kai hē ousia phanera kai hē holē tōn genōn pros allēla diastasis*). (I.2.4)

On first reading this might suggest that the making plain of the *ousia* was the aim of the inquiry, especially if with Hort one takes the *genē* referred to to be those of plants. The *hē* that begins the very next line, however, clearly picks up our *ousia* and is explicitly referred to the parts.⁶² A *diastasis* need be only a firm distinction, or set of distinctions,⁶³ and implies no more than Hort's "general differences between" does. Still, I wonder if the *genē* are not of *parts* rather than of plants, even though plants in general, as compared and contrasted with animals, have just been mentioned (I.1.3), since the wider context, for some length in either direction, is the *diarithmēsis* (I.1.9) of parts and their constituents.

Hort's reading might be thought to be supported by the closing lines of that *diarithmēsis*, at I.2.6.:

Having now, we may say, taken all the parts, we must endeavour to give the differences between them and the essential characters (*ousiai*) of trees and plants taken as wholes.⁶⁴

However, Theophrastus' use of *ousia* is rather loose, and in I.2.6 seems to mean no more than "the features trees, and plants, have as a whole." We have seen earlier (above p. 119) how Theophrastus often uses *hē morphē* or *hē holē morphē* with this meaning, and that he in fact goes on to review these differences just after reviewing those of the parts. What is striking is the way in which, apparently, *ousiai* is used later on (I.14.3) for plants as the subject of (at least a subset of) just such features:

Thus we must endeavour to study in the light of the instances mentioned the differences seen in the various parts of the plants [i.e. enough, then, for the differences in parts]. But there appear to be the following differences which affect the plant's whole being.⁶⁵

"The plant's whole being" here surely means no more than "the plant as a whole," as is certainly clear from the next to last sentence of *HP I*, the translation of which appears above (p. 121), and the Greek in n.52. The differences of *hai allai ousiai* in that passage must mean (which is not to say it translates into) "those differences discussed, over and above those of the parts, which belong to the *ousiai*—i.e. to the plants as wholes."⁶⁶ If *ousia* in this use

has any tie with its technical meaning, it is as designating one (or more) of the *ousiai* in the world (in the sense of Aristotle's *Metaphysics* Z.2), not the *ousia* of any of those *ousiai*.

Some occurrences of *ousia* in *HP* I do, of course, bear the latter, more definition-centered meaning, but I do not think any of them occur in passages that speak to the purpose of the enterprise. So we must conclude that the production of definitions of essential nature of plant kinds is not a distinct purpose of *HP*, not even ultimately. But I say "distinct" because definitions also have a role as first principles of demonstration, or explanation, and in this role there is some evidence that Theophrastus had an interest in them. The evidence is unfortunately outside of *HP* but is not without some use. Consider the opening lines of *De Causis Plantarum*, quoted earlier for another purpose, and a passage later on in that work:

That the modes of generation are several, and how many and what they are, is stated in the *Historia*. Since not all occur in all [plants], it is proper to divide off those that belong to each and on account of what sort of causes, using *archai* drawn from (*kata*) their *idiai ousiai*. For, our accounts (*logous*) must first of all be in harmony with what is said there. (I.1.1, tr. mine.)

In dealing with all other occurrences in trees or plants, we must endeavour to start with the study of trees, taking as our bases (*lambanontas*) the *idia ousia* of each and the nature of its countryside, since from these the common attributes (*koina pathē*) and the variations between kinds (*hai kata genē parallagai*) and what [sort of countryside] comports with and is appropriate to each of them will become evident. We must also be able to discern (*theōrein*) what is merely similar and what is the same, since many things which differ are not thought to differ, as in other matters. (II.19.6; Einarson's tr., modified.)

These passages make clear that definitions which state the *ousia* of plant kinds will play a crucial role in the causal explanations that explanatory treatises such as *CP* are aimed at offering, and a study is needed of how they will do that.⁶⁷ There is no indication in either of these passages, however, that the study of differences, which *HP* clearly is, will help us toward that end. But I think there is in the fascinating passage from Theophrastus' little tract we call his *Metaphysics* which I have quoted at the head of this paper.

As Ross explains in his commentary (p. xxii), this passage "develops the notion that difference is an essential feature of the universe" and builds on this "the thesis that it is essential that knowledge should take account of the differences between things." The passage invites several remarks germane to our inquiry.

- (1) It defines the task that perception passes to thought as "studying the differences and searching out the causes." This characterization (which incidentally mirrors *HA*'s description of the *methodos* of which it aims at

- completing the first half)⁶⁸ makes no mention of definition as a basic task of thought. Once armed with the differences it “searches out the causes.”
- (2) Since “therefore” translates *ara*, the task of “studying the differences and searching out the causes” is central to the achievement of *understanding* (*epistēmē*) which, from its role in the passage, seems the overriding aim of thought. That is not, however, the main thrust of the second paragraph.
 - (3) The point of the second paragraph is rather that the grasp of differences is necessarily central to this overriding aim of understanding. This is argued first from the plurality of the things that are and the nature of universals, but then from a thesis about understanding, namely that it is almost always of *idia*.
 - (4) This thesis is itself argued for from—to interpret—a premise about the starting points of understanding and a premise about its objects, the attributes (*kath’ heauta kata sumbebēkos*) whose possession by their subjects we are to understand.
 - (5) The premise about the starting points is actually a premise about “the *ousia* and the *ti ēn einai* of each thing,” namely that it is *idion* to its possessor, and as a premise (*gar*) in the argument for the centrality to understanding of grasping difference, it seems to imply that the grasp of “the *ousia* and the *ti ēn einai*” depends on, is built upon, a grasp of difference.
 - (6) Perhaps as a corrective to an overemphasis on difference, the passage reminds us that understanding also involves, perhaps in some sense more centrally involves, a grasp of sameness (which can come in various forms). This may suggest that of the various tasks that are involved in the achievement of understanding—the detection of differences, the discovery of causes, the development of definitions—all or some of them involve a grasp of sameness.
 - (7) As is clear from the survey of the types of sameness, any grasp of sameness involves as well a grasp of differences, and the achievement of understanding starts from a study of differences (which itself aims at the achievement of that understanding). It would seem, in sum, that the study of differences has the achievement of definitions as a part of its aim.

My deliberateness here stems from the complexity of this passage, which I find fascinating for the amount of theory, or its intimation, that has been packed into such a small space (and of course for the theory so intimated). And perhaps it is indicative too of a well of uncertainty (in my own mind, I mean) that my analysis has now reached.

It seems clear that the study of differences, which *HP* certainly is, is aimed more ultimately at the discovery of causes and at the development of the definitions that play a fundamental role in the exposition of that discovery. My reading of this *Metaphysics* passage brought into focus for me an obvious fact, but one worth noting because the standard texts that we have used to explore

the problem of the aims of a *Historia* do not I think make mention of it, namely that the “grasping of differences” and the “search for causes” are themselves components of the striving for *understanding*.⁶⁹ The uncertainty concerns the exact formulation of how the development of definitions and the search for causes are connected, and why it should be natural in the Aristotelian tradition to speak of science as aimed at differences and causes, not at definitions, yet of the grasp of definitions as central to understanding. We know all the pieces, but I do not know how to sort them out. I take comfort, however, in the fact, or what I take to be a fact, that one can go a long way toward understanding the aims of an Aristotelian *historia*, whether *plantarum* or *animalium*, without resolving this (what I at least take to be) deep problem in the interpretation of Aristotelian philosophy.⁷⁰

For, I think what our discussion shows is that the aims of the *Historia plantarum* are the same as those of the *Historia Animalium*, in both the short term and the long; that the immediate aim is the laying out of all the differences that are to be found among the kind of thing under study, that this is to be done systematically, by major categories of difference, and by successive subdivisions within each of those categories; that the more ultimate aim is the discovery of causes, and perhaps *the* ultimate one is best expressed as the achievement of understanding; that these more ultimate aims involve, in some way that is not really clear, the development of definitions of essential nature; and that the arrival at what Lennox and I have called “widest-class generalizations” plays an essential role in the transition from the laying out of differences to the discovery, and laying out, of causes.

I think it is also the case that Aristotle was farther along in *his Historia*—at least so far as the *parts* of their respective organisms were concerned—than Theophrastus was in his, in that *HA* has much more in the way of these widest-class generalizations that both thought necessary to the establishment of causes than does *HP*. Finally, I do not think I have found anything in Theophrastus to suggest that the picture that David Balme, James Lennox, and I (in our various ways) have been building up of *HA* needs important modification; in fact, I think rather that it confirms that picture.

Our investigation of *HP* confirms as well two remarks made (if our ancient source is correct) some twenty-two hundred years apart. In his magisterial *Die Philosophie der Griechen*, Eduard Zeller wrote that “In creative power of intellect [Theophrastus] is not indeed to be compared with Aristotle. . . . The fundamental principles of the system suffer no changes and are not infrequently stated in the very words of Aristotle.”⁷¹ And what did Aristotle himself think of this? Diogenes Laertius tells us that “It is said that Aristotle applied to him and Callisthenes what Plato had said of Xenocrates and himself . . . namely that the one needed a bridle and the other a goad; for Theophras-

tus interpreted all his thought with preeminent cleverness."⁷² If Aristotle had hoped for more, as we might have, his characteristic generosity did not permit him to say so, at least not for posterity.⁷³

NOTES

1. Tr. after Ross, in W. D. Ross and F. H. Fobes, *Theophrastus Metaphysics* (Oxford: Clarendon Press, 1929). Bracketed portions are not in the Greek but are added for clarification.
2. D. M. Balme, "The place of biology in Aristotle's philosophy," ch. 1 of *Philosophical Issues in Aristotle's Biology*, ed. A. Gotthelf and J. G. Lennox (Cambridge: Cambridge University Press, 1987). Cf. also P. Pellegrin: "If anachronism is the cardinal sin for historians, perhaps historians of science are the most likely sinners" (*La classification des animaux chez Aristote*, [Paris: Les Belles Lettres, 1982], p. 9; English transl. by A. Preus of rev. ed., *Aristotle's Classification of Animals*, [Berkeley, University of California Press, 1986].)
3. Much of what follows on *HA* is excerpted from a fuller discussion of "Philosophical Lessons of Aristotle's *Historia Animalium*" which was presented as a lecture to A. C. Crombie's seminar on the History of Science and Medicine at Oxford in February 1984.
4. Introduction and appendices to a new edition of *HA*, in preparation for Cambridge University Press; the argument is summarized in "The place of biology in Aristotle's philosophy" (above n.2). About half the manuscripts that contain all nine books also contain a tenth, (though all from one family), which has long been held to be spurious. P. Moraux (*Les listes anciennes des ouvrages d'Aristote* [Louvain: Éditions universitaires, 1951], p. 107 n.15) identifies it with the *Huper tou mē gennan* which appears among the biological writings in Diogenes Laertius' list of Aristotelian works. Balme has accepted this identification but argues in his introduction to vol. III of the Loeb *HA*, forthcoming, and more fully in a separate paper, that while not part of *HA*, it is in fact by Aristotle and is a pre-*GA* treatment of the female contribution to generation (cf. "Historia Animalium Book Ten," in *Aristoteles: Werk und Wirkung*, Paul Moraux gewidmet, 2 vols. [Berlin: W. de Gruyter, 1985], I. 191–206).
5. This compares with, e.g., 58 for *PA*, 74 for *GA*, 83 for the *Physics*, 87 for the *Nicomachean Ethics*, and 113 for the *Metaphysics*.
6. It is called a *historia* at I. 491a12. LSJ connect *historia* and the verb *historeō* with the Homeric noun *istōr* (sometimes *histōr*), "one who knows law and right, judge," which Hesiod uses as an adjective, "knowing, learned." Some inscriptions have it beginning with a digamma and meaning, according to LSJ, "witness"; they derive it from *Fid-tor* and connect that with **eidō* and *oida*. The first uses of *historia* they record are from Herodotus and Plato where, interestingly, the investigation is as much an inquiry into the causes of the phenomena being examined as it is a delineation of the phenomena themselves: cf. e.g., *Phaedo* 96a6–10.
7. *Theophrastus De causis plantarum*, vol. I, p.ix.
8. G. H. Lewes, *Aristotle: A Chapter from the History of Science, including Analyses of Aristotle's Scientific Writings* (London, 1864), p. 271. Lewes began his chapter on *HA* by ridiculing the following statement of Cuvier on the treatise: "I cannot read this work without being ravished with astonishment. Indeed it is impossible to conceive how a single man was able to collect and compare the multitude of

particular facts implied in the numerous general rules and aphorisms contained in this work, and of which his predecessors never had any idea." (*Histoire des Sciences Nat.*, 1841, I., 146 [cited by Lewes on p.269].)

9. "Aristotle's use of differentiae in zoology," in *Aristotle et les problèmes de méthode*, ed. S. Mansion (Louvain: Publications universitaires, 1961), 195–212.
10. This is argued more fully in "GENOS and EIDOS in Aristotle's biology," *CQ* n.s. 12 (1962), 81–98.
11. *Topics* IV.2 122a3ff. and 122b15, Balme reminded us, make a firm distinction between a *genos* and a *differentia* and urge us not to confuse them.
12. See p.206, with n.25.
13. J. Barnes, M. Schofield, R. Sorabji, eds., *Articles on Aristotle*, vol. I: Science (London: Duckworth, 1975) 183–93. This study has now been reprinted once again, slightly modified, with its first section replaced by a new paper on "The reform of *diairesis*," as part II of "Aristotle's use of division and differentiae," ch. 4 of *Philosophical Issues in Aristotle's Biology* (above, n.2).
14. Cf. pp.192–93.
15. My source for Balme's views in the late 1970s is an unpublished talk, "The place of biology in Aristotle's philosophy" (different from the 1987 paper under the same title cited in n.2 above) given at the Institute for Advanced Study, Princeton, in 1977. In this paper the eventual aim of a systematic classification of the animal world, subsequent upon the discovery of causes, is still present, but it recedes even further into the background than it had in the 1975 revision of the 1961 paper.
16. This paper was derived from a draft of his introduction to the third volume of the Loeb *HA*.
17. Cf. *Philosophical Issues in Aristotle's Biology*, (above, n.2), ch. 1: "The place of biology in Aristotle's philosophy," and part I of ch. 4: "The reform of *diairesis*." In these papers Balme endorses the thesis argued by Pierre Pellegrin, in ch. 2 of *La classification des animaux chez Aristote* (above, n.2), that *genos*, *eidos*, and analogy are used in the biology in harmony with their use in the logic, *Metaphysics*, and *PA* I, and that in both sets of places an *eidos* is always a sub-division of some *genos*, but that this relationship may exist at any level, and is not restricted to some fixed taxonomic stage, for there is no taxonomy in Aristotle, and no ultimate aim at one. This involves abandoning the claim of inconsistency between Aristotle's logic and his biology which Balme made in his 1961 and 1962 papers (above, n.10), but sits well both with his own denial of taxonomy and with his new emphasis on definition as an aim of *HA*.
18. This account of the development of Professor Balme's view of the aims of *HA* takes us through 1983. He is currently at work on a new edition with commentary of the whole of *HA* (above, n. 4) and it will be interesting to see what shape his view takes as a result of that work. The picture I have given of his current views and the story of its development are constructed from the works cited, and not directly from conversation. For Balme's views on the form that the resultant causal definitions will take, their connection with demonstration, and the metaphysical issues involved, see the papers cited in the previous note, and ch. 11 of *Philosophical Issues in Aristotle's Biology*, which joins to a slightly revised reprint of "Aristotle's biology was not essentialist" (*AGPh* 68 [1980]) two new appendices, "Note on the *aporia* in *Metaphysics Z*" and "The snub" (itself reprinted from *Ancient Philosophy* 4 [1984]).
19. W. Kullmann has also made this suggestion, we later learned, and developed it in ways similar to Lennox, in *Wissenschaft und Methode* (Berlin: de Gruyter, 1974).

20. "Divide and explain: the *Posterior Analytics* in practice," ch. 5 of *Philosophical Issues in Aristotle's Biology* (above, n.2).
21. The full proof, written in canonical form, would involve a sequence of syllogisms. (Cf. *Met* IX.9 1051a24–26 and H. Mendel, "Two geometrical examples from Aristotle's *Metaphysics*," *CQ* 34 [1984], 359–62).
22. I do not myself think that what Lennox calls "A-type explanations" are actually offered by Aristotle as *explanations*. *APo.* II.14 introduces its subject as the question of how we are to formulate the propositions expressing the connections *to be explained*. The syllogisms that Lennox presents as explanations of a certain sort are rather articulations of the steps involved in finding the right level of generality for these *explananda*. Aristotle's point in *APo.* I.4–5 is not that isosceles triangles' possession of 2R is explained by their being triangles. Rather, it is that isosceles triangles' possession of 2R is explained by *the very same thing* that explains triangles' possession of 2R (and that one will understand that explanation only—or better—when the wider subject is used). I do not have space to argue this here, but in any case this reservation does not affect Lennox's main thesis, that Aristotle's practice in *PA* mirrors the insistence in *APo.* that explanation be at the right level, with which I thoroughly agree.
23. Lennox presents his own case for our hypothesis in "Divide and explain" (above, n.20) and in "Between data and demonstration: the *Analytics* and the *Historia Animalium*," *The Interaction of Science and Philosophy in Classical Greece* ed. A. C. Bowen (Pittsburgh: IRCPS, forthcoming).
24. See *APo.* II.14 98a 13–19 on how to deal with the absence of a name for the subject group in question.
25. This, of course, does not rule out *HA*'s having as a simultaneous aim the informed and analytical laying out of differentiae which Balme has suggested in his more recent work it does (cf. above, pp. 000–00). A full picture will need to include both aims, but here I focus on the case for the "widest-class" hypothesis Lennox and I have developed being part of that picture.
26. There are also implications of our hypothesis for the relationship between the biological works and the "philosophical treatises" (and more generally for, in Balme's words, the place of biology in [*sic*] Aristotle's philosophy), which cannot be dealt with here. On the connections between the biology and the philosophy, see the various essays in *Philosophical Issues in Aristotle's Biology*, (above, n.2).
27. I say "our" because the chapter divisions have no ancient authority, and are not found in the manuscripts. There are no chapter divisions for the biological works in the first printed edition (the Aldine of 1495–8), and none appear in Greek texts until the second Basel edition of 1539. These appear to derive from Theodorus Gaza's 15th c. Latin translation of the biology, *De animalibus* (*HA*, *PA*, *GA*). I have been unable to consult the one surviving ms. of this work, but the first printed edition (Venice 1476) divides the Books via large initials into sections which correspond in a great majority of cases (but *not* in all) with our current divisions. The first edition which does fully correspond is the 1492 Venice edition printed by Iohannes et Gregorius de Gregoriis fratres, on the title page of which we are told that "Sebastianus Manilius Romanus recognovit & per capita disposuit." (My thanks to the British Library for making all these wonderful editions so easily available.) It is worth remembering that our chapter divisions are the construct of late Medieval or Renaissance editors and not Aristotle's own, and worth reading the text right through them to see if its import changes. Sometimes it does.
28. A dramatic set of such cases, to which Balme has already drawn our attention, are the occasional sustained discussions of single low-level animal types, such as the

chapter on the chameleon (II.11). In this discussion, for instance, Aristotle describes both the external and the internal parts of the chameleon together, and even includes information about its activities and mode of life, and this survey seems to make comparisons to other animals only for purposes of identification. It is clear from the passage (503b19–28) that Aristotle (or his source) has dissected the chameleon. Balme very plausibly suggests that what we have here is a preliminary stage of the Aristotelian investigation, material which has not yet been distributed to its proper places, not yet integrated into the separate discussions of external and internal parts of oviparous quadrupeds, but merely tacked on to the end of one of the discussions into which its material will be integrated. But this sits well with our “widest-class” hypothesis. After all, one cannot reach widest-class correlations before one knows *how* animals differ from each other, but one cannot know that before learning what features they in fact *have*, and these passages reflect such an earlier stage of investigation.

29. Cf. E. Zeller, *Aristotle and the Earlier Peripatetics*, tr. B. F. C. Costelloe and J. H. Muirhead, 2 vols. (London, 1897), II. 354; J. J. Keaney, “The early traditions of Theophrastus’ *Historia Plantarum*” *Hermes* 96 (1968) 293–98, and pp. 15–16 of the paper by Sollenberger in the present volume.
30. One such scholar is C. R. Burckhardt (see Peck’s note on him in the introduction to his Loeb edition of *HA*, p. li), in “Das erste Buch der aristotelischen Tiergeschichte,” *Zoologische Annalen* (Würzburg) I (1905), 1–28, who would place 486a5–487a10 at the end of the first chapter (488b28). David Balme argues for its retention at the beginning, on the grounds that the treatise properly begins with a survey of the different ways animal features may be the same or differ, as a necessary prelude to a discussion of those samenesses and differences, and notes that these modes of difference are explicitly applied in *HA* VIII and IX to features other than parts, but acknowledges the awkwardness of the fact that this application is not even hinted at in the present opening passage. I am myself inclined to Balme’s view, and note only that this diminishes very little the parallel between *HP* and *HA* about to be noted.
31. All translations of passages from *HP* are from Hort’s Loeb edition, unless otherwise indicated.
32. A similar point is made in passing in I.1.5. Specific comparisons and contrasts with animals are made at least in the following additional places in Book I: 1.3 (four or five times more), 1.9, 1.12 (twice), 2.5 (three times), 4.2, etc.
33. Thus, plants may differ in respect of parts, Theophrastus says, in that (1) one plant has it, another not (cf. *HA* 486b11–14—wording very close); (2) they are unlike in shape, color, compactness, texture, and the other *pathē* (*HA* 486a25–b6: many differences “lie in the contrasting opposition of their *pathēmata*, e.g. color and shape”), or in “excess or defect” (*huperochē kai elleipsis*) in number or size, “or, to speak generally, all the above mentioned differences are included under excess and defect: for the ‘more’ and the ‘less’ are the same thing as excess and defect” (*to gar mallon kai hēttōn huperochē kai elleipsis*; *HA* 486b16–17: *to gar mallon kai hēttōn huperochēn an tis kai elleipsin theiē*); (3) they are differently arranged, e.g. differently positioned, or symmetrical or not (cf. *HA* 486b23–487a1).
34. *peri hōn tupōi men eipōmen prōton* (487a12–13). Cf. Theophrastus’ use of *tupōi* in the previous note.
35. *HA* I.6 begins: *genē de megista tōn zōiōn, eis ha diēiretai talla zōia, tad’ estin*. A few lines later (490b16–17) they are in effect characterized as cases where one *eidos periechei* many *eidē*.
36. I.3.2ff; cf. above, n.12, for evidence of Aristotle’s concern.

37. Cf. Ar., *De resp.* 480b22–24: “As for health and disease it is the business not only of the physician but of the natural philosopher to discuss their causes up to a point.” (Tr. Hett.)
38. And that is an oversimplification, as the books on parts review them first for external, then again for internal parts, those on generation first for copulation, then for mode of generation, and there are at least three distinct reviews in *HA* VIII–IX.
39. For a view of what Aristotle’s purpose might be, cf. J. G. Lennox, “Divide and explain” (above, n.20), 104 n. 30. Alternatively, the relatively limited amount of information available about the bloodless kinds, and/or the way the widest-class generalizations fall out, might not call for separate surveys.
40. In fact, I believe it is a matter of “unsureness” or inability and not a deeper theoretical purpose. H. B. Gottschalk (below n.73) has commented to me that “the unsureness you find in Theophrastus [in *HP*] is characteristic of his thinking,” and refers to D. E. Eichholz’s introduction to his *Theophrastus: De lapidibus* (Oxford, 1965), p.5ff. (cf. esp. p.7 n.1), and W. D. Ross’ introduction to the *Metaphysics* (above, n.1), p.xxv f.
41. “I mean differences such as those in size, hardness, smoothness or their opposites, as seen in bark, leaves, and the other parts; also, in general, differences as to comeliness (*eumorphia*) or its opposite and as to the production of good or of inferior fruit.” On *hē holē morphē* in I.1.8, see n.66 below.
42. Hort’s tr. modified. This last clause seems a reference to features falling under *morphē*, and any others that belong best with parts but are not themselves parts.
43. In later books Theophrastus sometimes falls into such identificatory surveys by type and sub-type, especially, I think, for the wilder kinds, which would be more unfamiliar to his listeners. Aristotle, too, falls into this at least once in *HA* IX with birds. But the connection of the type and sub-type survey to the review of animal *ēthē* which in the surrounding context seems clear (cf. IX.19–28 with the preceding and succeeding chapters). The bird names (*cum* minimal descriptions) are brought in as headings under which facts about their *ēthē* are to be classified. These bird-types eventually are to be grouped as they agree, or disagree, in *ēthē* (as has already been done, or is about to be done), for the other birds, and more generally the other animals. But however this may be, the immediate point is that such kind-by-kind surveys, not clearly exemplifying particular differentiae, are rare, certainly in Aristotle, and, I think, also in Theophrastus.
44. 491a9: *hina tas huparchousas diaphoras kai ta sumbebēkota pasi labōmen.*
45. Tr. Hort, with “differences” for *diaphorai*.
46. My own translation. The “things” are the broad category of parts.
47. Cf. n.56 below.
48. For similar indications of purpose, cf., e.g., I.5.4, I.6.1, I.6.3, I.6.7, I.6.12, I.7.3, I.10.8, I.14.2. This study of differences, Theophrastus makes clear in passing in a remark in Book VII, is *not* a study of oddities: “Possibly one might mention many other eccentricities (*peritta*). But as has been repeatedly said, we must only study the peculiarities (*tas idiotētas*) and differences which one plant has as compared with others.” (VII.15.3. I have replaced Hort’s translation of *theorein* as “observe” with “study” as it seems most often to mean in *HP*.) The concern to study differences in order to make possible explanation, which I attribute to *HP*, can be shown to be manifested in Theophrastus’ other scientific works as well. I thus take issue with the thesis maintained by John Vallance in his contribution to this volume, that Theophrastus has a special interest in *perrita*. Cf., e.g., *De lapidibus* 48

init. (brought to my attention by H. B. Gottschalk) with E. R. Caley and J. F. C. Richards, *Theophrastus on Stones* (Columbus: Ohio State University, 1956), p.9, and *De igne* §§ 44 *fin.*, 57 *init.* Dr. Gottschalk suggests that the method of arranging data by *differentiae* may be found even in the *Phusikōn doxai*. The fragment quoted by Athenaeus (IX.387B) from Theophrastus' "*Peri zōiōn* III" is also suggestive: "The birds have this difference: while some are heavy and do not fly, e.g. francolin, partridge, cock, pheasant, [those] immediately can walk and have their feathers."

49. Pp. xxi–xxii (xvii–xviii in first printing).
50. P.ix. In a sixty-seven page introduction Einarson says nothing more about the aims of these treatises than this.
51. . . . *hina prōton tas huparchousas diaphoras kai ta sumbebēkota pasi labōmen. meta de touto tas aitiās toutōn peirateōn eurein.* (491a9–11) David Balme has suggested (cf. above, n.4) that the entire methodological passage in I.6 of which this is a part may well have been added to *HA* when it was prepared as a lecture course in the Lyceum, to be delivered before the *PA* and *GA* courses, although actually written after them.
52. *alla de tas men tōn moriōn diaphoras kai tōn allōn ousiōn ek toutōn peirateōn theōrein.* (I will comment on this use of *ousia* in a moment.) Note the similar passage at I.14.2: *tas men oun kata ta merē diaphoras periateōn ek toutōn theōrein*, where *tauta* are themselves the differences of the parts.
53. *Sc.* both those into tree, shrub, undershrub, herb (cf. I.3.2–3) and those into wild/cultivated, flowering/flowerless, evergreen/deciduous, etc., which he has just been arguing have fuzzy edges.
54. *Sc.* (from the sentence that follows) and a natural difference in wild vs. cultivated.
55. I have not replaced "distinctions" with "divisions," in the first sentence, as I have usually been doing, since as Hort notes *toiauta diaireteōn* is only a twofold conjecture, part by Schneider part by Wimmer, for the Aldine *tois autois haireteōn*. (Neither says what the mss. readings are.) Hort's text is full of conjectures by Wimmer and Schneider, many apparently without direct basis in the mss. A new edition of *HP* surely is a desideratum.
56. Pp. 105–6. Compare in particular Aristotle's injunctions at *PA* I. 639a15, repeated at 644b1, 645b10, and note 645b1: "It is necessary first to divide off, in relation to each kind, the attributes that belong essentially to all the animals [of that kind], and then to try to divide off their causes." (Tr. Balme, additional clarifying phrase my own.) In his note to 645a36–b14, which includes this passage, Balme writes: "This recapitulates 644a23–b7 and 639a15–b10, but adds that we should next state the causes of the common attributes, i.e. before going on to those peculiar to genera or to species." Whether Theophrastus' practice in *CP* is in agreement with this injunction at I.3.6 is a matter requiring separate investigation, but such passages as this and, for instance, I.5.1 (quoted above 119), make clear that he is sensitive to the issue.
57. At 491a11–14, on Lennox's analysis ("Divide and explain," above n.20). The text there, following immediately upon that quoted in n.51 above, reads: *houtō gar kata phusin esti poieisthai tēn methodon, huparchousēs tēs historias tēs peri hekaston· peri hōn te gar kai ex hōn einai dei tēn apodeixin, ek toutōn gignetai phaneron.*
58. I.2.4. The second sentence reads in the original: *hai gar dunameis kai hōn charin hekaston husteron rēthēsontai*. The *gar* seems important to our discussion, but I am not sure what to make of it.
59. The opening words of *CP* speak only of a study of generation: "That the modes of

generation are several, and how many and what they are, is stated in the *History*. Since not all occur in all [plants], it is proper to divide off those that belong to each and on account of what sort of causes, using principles drawn from their peculiar *ousiai*. For, our accounts must first of all be in harmony with what is said there.” (Tr. mine.) Compared to *GA*, it is worth noting, the limited explicit attention to the final cause in *CP* is no great surprise, though to many readers Theophrastus has seemed to be one more person who, with respect to any cause beyond material necessity, merely “touched on it [in *CP* I.1.1] and said good-bye.” A satisfactory analysis of the role of teleology in *CP* will need to take account of its character as a “*GP*” and not a “*PP*.”

60. A clear example is the first paragraph of I.10.8. There are a few others, but they do seem few and far between. There are no occurrences of the “redundant quantifiers” discussed earlier (pp. 110–11), and none of the other evidences for Aristotelian preoccupation with widest-class generalizations is in evidence in *HP* I.
61. P. 122 (and n.58).
62. *hē men oun tōn megistōn schedon eirētai: legō d’ hoion rizēs kaulou tōn allōn*. The next line of the Greek is quoted above in n.58, which is attached to Hort’s translation of the whole passage.
63. LSJ and Bonitz, s.v.
64. *eilēmnenon de pantōn tōn moriōn hōs eipein tas toutōn diaphoras peirateon apodidonai kai tas holōn tōn dendrōn kai phutōn ousias*.
65. I say “at least a subset” because I have only now seen clearly that in his actual review of differentiae, Theophrastus makes a clear distinction between features that fall under *hē morphē* (or *hē holē morphē*), which are reviewed in I.12, before the present passage, and those that “affect the plant’s whole being.” However, in the preliminary overview in I.4, from which I quoted earlier and to which I just referred, the distinction is less clear (and cf. the summary remark at the end of I.4.3) but is made nonetheless. However, it is made without the use of *ousia*, and seems clearly to be between differentiae on the same level, supporting my suggestion that *ousia* in the present passage has no metaphysical (or definitional) significance.
66. I do not think *hē holē morphē*, in the interesting line at the close of I.1.8, means anything stronger than we have found it to mean elsewhere (above 119). It has the same position in the preliminary survey of differences ending there that the discussions of overall features have in the full review, and I wonder if a remark in I.14.3, soon after our first *ousia* passage, might not bear that out: *kai pōs ta ge toiauta en tois meresin ē ouk aneu tōn merōn estin*. But I am not sure, and I am not able to explore it here.
67. I have attempted this for Aristotle in “First principles in Aristotle’s *Parts of Animals*,” ch. 7 of *Philosophical Issues in Aristotle’s Biology* (above n.2). See also my “Notes towards a study of substance and essence in Aristotle’s *Parts of Animals* II–IV,” in *Aristotle on Nature and Living Things: Philosophical and Historical Studies* presented to David M. Balme on his seventieth birthday, ed. A. Gotthelf (Pittsburgh: Mathesis, 1985).
68. Quoted in nn.51 and 57 above.
69. Though the famous passage in *PA* I.5 aimed at motivating students to the study of animals, even the “less-valued ones,” even their insides, argues in part from the *epistēmē* such a study will engender.
70. Some important pieces of the puzzle can be found, I think, in Robert Bolton’s “Definition and scientific method in Aristotle’s *Posterior Analytics* and *Generation of*

Animals," ch. 6 of *Philosophical Issues in Aristotle's Biology* (above n.2). One wishes, of course, that we had some of Theophrastus' own *Posterior Analytics*. (Zeller mentions an anonymous scholium [*Schol. in Ar.* 240a47] according to which for Theophrastus "definition is embraced under demonstration," and refers to two or three other "equally unimportant" testimonia concerning definition and/or demonstration from the commentators. His characterization of their usefulness is unfortunately apt. Cf. *Aristotle and the Earlier Peripatetics* [above n.29], II.363 n.1.)

71. *Aristotle and the Earlier Peripatetics*, II. 351, 355 (and cf. 355 n.4).
72. . . . *tou men Theophrastou kath' hyperbolēn oxutētos pan to noēthen exermeneuontos* (V.39, tr. after Hicks).
73. An earlier draft of this paper was presented to the 1985 Project Theophrastus conference, "Theophrastus on Science," at the University of London, and was commented on by William Fortenbaugh. My thanks to Professor Fortenbaugh, James Lennox, and Mario Mignucci, for very interesting discussion, and to Dr. H. B. Gottschalk for kindly providing me afterwards with valuable written comments.

PART III

**PAPERS ON PHYSICS AND
METAPHYSICS**

8

Theophrastus on Place

Richard Sorabji

Even though only two fragments on place survive from his work, I believe that Theophrastus had an important impact on Ancient Greek treatments of the subject. First, he collected doubts that proved to be seminal about Aristotle's definition of place. Then he offered his own reinterpretation of the idea of natural place. I shall try to describe his position in the context of the whole tradition.

DOUBTS ABOUT ARISTOTLE'S DEFINITION OF PLACE

To consider the first of his two contributions, I must outline Aristotle's ideas. Aristotle offers at least four views on place. In the early *Categories*, he classifies place as a quantity and seems to think of it as coextensive with the body that occupies it.¹

In *On The Heavens*, Aristotle stresses *natural* place. In his geocentric cosmos, the natural place of fire is up above at the periphery of the sublunary world with only the heavens above it, and the place of earth is down below at the center. The other two sublunary elements, air and water, are assigned intermediate positions. If *per impossibile* the earth were dislodged from the center, loose clods would fall not toward the main mass, but to the *place* where they fall now.² Mere vacuum would contain no differences, and hence not the up and down by which natural motions are defined,³ nor could it act as a cause (*aition*) of motion.⁴ Aristotle evidently wants natural places to play an explanatory role in the natural movement of the elements toward them, for he says that such motion shows that place has power (*dunamis*).⁵ The most likely explanatory role, although he never says this, is as a final cause or goal (not consciously sought) of motion.⁶

In biology, Aristotle offers a definition of up, down, front, back, left, and right in terms of biological function. Up is defined by the intake of food, so

that the upper parts of a plant are its roots, according to his theory. Right is defined by the initiation of motion, and front by the direction of the gaze. These ideas are applied not only to plants and animals, but also to the cosmos as a whole, where the initiation of motion can be located by reference to the poles.⁷

Finally, in the *Physics* Aristotle defines place, roughly speaking, as a thing's surroundings. A thing's immediate place is the inner surface or boundary (*peras*) of the body that surrounds and contacts it, as the air surrounds and bathes a person.⁸ In representing a thing's place as a surrounding surface, rather than as a three-dimensional extension (*diastēma*) that goes right through it, Aristotle quite deliberately rejects the view of place as extension,⁹ which seems to have been his in the *Categories*. And his rejection of the idea of extension helps to show why "place" (*topos*), rather than space (*chōra*), is the appropriate word for the concept he is getting at.

He sees no conflict between his definition of place as a surrounding surface or boundary and the idea of natural place.¹⁰ We shall see that several Neoplatonists later objected that a mere surrounding surface, in the literal sense, could not account for natural motion in the way that natural place is supposed to do.

The most perplexing dilemma in Aristotle's account of place, it has been said,¹¹ and one that greatly exercised the Middle Ages, arises from his adding to the requirement of immediate contact the further requirement that the contacting surface that constitutes a thing's place should also be *immobile*. Aristotle himself recognises the problem, that the water surrounding a boat and in immediate contact with it may *not* be immobile. And so on the standard interpretation, he withdraws his original insistence on immediate contact and redefines a thing's place as the first (that is, the nearest) *immobile* surface or boundary of the surrounding body. The place of the boat would not, after all, be the inner surface of the water that immediately contacts it, but the inner surface of the whole river, that is (on the standard interpretation) of the river banks and bed:

And as a vessel is a portable (*metaphorētos*) place, so place is a motionless (*ametakinētos*) vessel. And that is why when something moves and changes within a thing that is [itself] moving, like a boat in a river, it uses its surroundings [sc. the water] as a vessel rather than as a place. Place, however, ought to be immobile (*akinētos*), which is why it is rather the whole river that is place, because the whole is immobile. So *the first immobile boundary (peras) of the surroundings* is what place is.¹²

But one difficulty is that Aristotle does not after all abandon the contact requirement upon setting up the immobility requirement, for he goes on to repeat it at least once in the immediate sequel.¹³ And it would be hard for him

to give it up, because one of the opinions about place that he lists as correct (*alēthōs*) and as constraining any satisfactory definition is that a thing's immediate place is equal to it in size.¹⁴ Moreover, whichever of the two requirements he prefers, he will be faced with philosophical difficulties. There is an advantage, which he does not himself point out, of switching to the immobility requirement: if the place of a boat were, as he first seemed to suggest, the inner surface of the water that contacted it, then a boat moored stock still in a moving river would change its place as the water moved on. For new water would bring a new water surface and hence a new place. Conversely, a boat drifting with the water would not change its place. These unwelcome results will be avoided if he makes a boat's place the surface of the river banks and bed. But in avoiding one set of problems, he will expose himself to another. First, a ferry plying between the two banks will not change its place (it is always between the same banks). Second, two ferries between the same banks will be in the same place as each other. Third, if the tide stops, the nearest immobile surface (and hence the place) will suddenly switch from being that of the banks to being that of the water in contact with the boat.

There would be a way of retaining both the contact and the immobility requirements: the inner surface of the water immediately surrounding a moored or moving boat might be described as immobile, on the grounds that it does not exist long enough to move. Admittedly, if we consider only a *portion* of that water surface, it comes into being when the water is parted by the boat, moves in relation to the side, and goes out of existence when the waters close again. But if we think of the *entire perimeter* of the water surface round the boat, we can say that it exists as a whole only instantaneously, being continuously replaced by new perimeters. This would indeed allow Aristotle to treat the inner water surface as the boat's immediate and immobile place, but only at a price. For it would give the result, already rejected above, that the moored boat continuously changes its place as new water surfaces come into being.

A much more promising solution has been offered by Myles Burnyeat, who tucks his most original interpretation into a footnote.¹⁵ First, he provides an alternative sense in which the whole river can qualify as immobile: not only do the banks and bed differ from the water in not flowing, but also the river as a geographical entity does not change course. Second, he invites us to think of a boat-sized hole within this immobile geographical entity, and to think of the boat's place as the rim (*peras*) of the hole. As an interpretation of Aristotle, this suggestion has great advantages. It enables him to retain the requirements of immediate contact and equal size, and, if successfully worked out, it would free him from the philosophical difficulties mentioned above. The only trouble is that if this is what Aristotle was getting at, he would need to develop his thought in unimagined ways in order to explain what he means by *immobility*.

The difficulties center on that fact that he insists on the immobility not of the *river*, but of the *peras*, or boundary,¹⁶ here construed as the *rim* of the hole, and indeed it is not the river, but the rim that we need to be immobile. These requirements do not come to the same thing, for in an immobile river, the rim surrounding a moving boat might naturally be thought of as moving. Aristotle must avoid that construction, since it would prevent the moving boat from changing its place. In order to find an immobile rim around a *moving* boat, he will have to surround it with a series of instantaneous rims, something he clearly has not thought of. As for a *moored* boat, he may be able to think of the surrounding rim, as he would wish, as *enduring*, although the enduring rim would be constituted by ever different water surfaces. But his problem then is how to specify the sense in which this enduring rim is *immobile*.

This sense may seem perfectly obvious. Thomas Aquinas supplies a sense in which the successive water surfaces surrounding a moored boat are immobile. But then Thomas recognises that he has to go beyond Aristotle in order to find it. He defines the place of the boat as the spatial relation (*ordo*) of the successive water surfaces that contact it to the whole immobile river, which is in turn fixedly related to the heaven with its immobile center and poles.¹⁷ Edward Grant has discussed this concept of place as a relation or distance, namely the fixed distance of successive water surfaces (sometimes construed as a single surface) from fixed points. There are anticipations of it in Grosseteste and Roger Bacon, and by the time of Buridan, it is called *formal* place, as opposed to material place, which is mobile.¹⁸ But the idea of fixed distances from fixed points goes far beyond anything in Aristotle. He would in any case have refused to put place in the category of relation. And once the idea of fixed distances from fixed points is used, it soon becomes apparent that the immobility of the river itself on which Aristotle concentrates is irrelevant. All one needs is a fixed distance between the rim of the hole and some fixed points somewhere in the universe. Nor is Aristotle any closer to Descartes' variant on Thomas, the idea of a boat's extrinsic place. This is a surface immediately surrounding the boat, which, however, belongs no more to the water than to the boat, and which remains the same, so long as the boat retains the same relation to other bodies, for example to the banks, which are *regarded* as unmoving.¹⁹

Aristotle's own way of giving sense to the idea of motion or rest in connexion with surfaces is different. The motion or rest of surfaces is *derivative* from that of the bodies to which the surfaces belong. This view does not apply to every kind of immobility (not to the immobility of *instantaneously* existing surfaces), but it does apply to rest, where rest implies the *possibility* of motion. Aristotle has to say that the rest of places is derivative for more than one reason: in its own right a place is incapable of retaining or changing its place,

because we cannot say it *has* a place, on pain of regress.²⁰ Moreover, it cannot have a place, if a place is defined as the two-dimensional surface of a thing's *immediate* surroundings. For the two-dimensional surface of the banks and bed immediately surrounding a river cannot itself be *immediately* surrounded by a further two-dimensional surface. Aristotle does think of the bank's surface as being at rest. But this is because he allows that points, and so he would allow that surfaces, can be in motion or at rest *derivatively*, or as he says *accidentally*, by belonging to a body that is in motion or at rest, like a sailor in a ship.²¹ So the bank's surface is supposed to *derive* its immobility from the bank, and that is no doubt how Aristotle would ascribe immobility also to the rim of an enduring hole in a river around a moored boat: the rim of the hole will *derive* its immobility from the river's not changing its course. The trouble with this line of thought is that it will give an unacceptable verdict about a case already mentioned. For if we apply it to the enduring rim that accompanies a moving boat (as opposed to the instantaneous rim which might provide its momentary place), that rim will wrongly be classified as immobile. Derivative motion and rest cannot so easily be inferred, as we have seen in other cases: an inner surface within some moving water may not itself have time to move, and, conversely, a pool of water that is not on the move from one place to another may yet have a rim that ebbs and flows. Aristotle would have done better to turn to Thomas Aquinas' idea of fixed distances to define the immobility of the rim. But that would have transformed his conception of place and brought the discussion forward by many centuries.

If only Aristotle could give satisfactory sense to the idea of the rim's being immobile, Burnyeat's suggestion would probably provide him with the best direction to take, and this may even be the direction he has insouciantly taken; yet further advantages of such an interpretation will emerge below. But if it is the direction he has taken, he has hardly begun to think it out, and it is not surprising that earlier commentators have overlooked it.

Now that the likeliest interpretations of Aristotle have been described, I can turn to the difficulties that Theophrastus assembles. There are five, and Simplicius summarizes them as follows:²²

Remember that in his *Physics* even Theophrastus raises puzzles (*aporei*) such as the following against the definition of place given by Aristotle: (i) A body will be in a surface. (ii) Place will be in motion. (iii) Not every body will be in a place—not the sphere of the fixed stars. (iv) If the spheres are taken together, the heavens as a whole will also not be in a place. (v) Things in a place will no longer be in a place if, without their changing themselves at all, (*mēden auta meta-kinēthenta*) their surroundings (*periechonta*) are removed.

Let us consider these puzzles in turn. There is a clue to the meaning of the first, because shortly after his report, Simplicius raises in his own person an

objection, which is found also in Philoponus, and which may be related.²³ We have seen that one of the data that Aristotle's definition claims to respect is that a thing's immediate place is equal to it in size. But Aristotle has assigned a two-dimensional surface as the place of a three-dimensional body, and that cannot be equal to the body in size, but at best only to the two-dimensional surface of the body. Newton was later to devise a variant objection: bodies equal to each other in volume ought to have their places equal to each other, but their *Aristotelian* places will not be equal. For if one body is for example a sphere, while the other has a dented configuration, the *Aristotelian* place of the dented body will cover a larger area.²⁴

Theophrastus' first puzzle, then, concerns the two dimensionality of Aristotelian place. His second concerns its *immobility*. We must recall that in Aristotle's geocentric cosmos, the elements are arranged as a nest of spheres, with earth at the center, partly surrounded by water, then by air, then fire, and with the transparent heavens in a series of up to fifty-five spheres round the outside. (I will speak of the spheres as the heaven in the singular when I want to speak of them collectively.) The trouble arises when we reflect that these cosmic components appear to be far from immobile. Simplicius and Philoponus develop the point.²⁵ None of the natural places in the cosmos is immobile, for the fifty-five celestial spheres rotate, and so do their inner surfaces. So also does the sphere of elemental fire beneath them, and air and water are also fluid and mobile. Aristotle himself seems to expect no difficulty about the heavens. At any rate, immediately after introducing the requirement that place be immobile (*akinēton*), he says that this is why (*dia touto*) the center of the cosmos and the inner surface of the entire heaven are thought of as being down and up respectively, because the former stays still (*menei*) while the latter stays the same way (*hōsautōs echon menei*).²⁶ This shows that he considers the inner surface of the entire heaven sufficiently immobile to serve as a place, and according to some manuscripts, he goes on a little later to say that it is at rest (*ēremoun*).²⁷ How can it be, we may wonder, if the heavenly spheres are rotating?

One answer is supplied by something that Aristotle says in a different connection. He argues that a rotating body moves only in a sense, for it does not as a whole change its place simultaneously; only its parts move in that way.²⁸ This is the defence explicitly offered by Eudemus,²⁹ and it is a view taken, in a different context, by Alexander of Aphrodisias and Themistius.³⁰ I will suggest below a positive reason why, in making place immobile, one might indeed not want to exclude its rotating. However, this solution does not deal with the case of water and air, which shift without rotating.

But on Burnyeat's interpretation, Aristotle would have thought that he could answer the difficulty. For the place or surface surrounding a bird in the air would on that interpretation be thought of as the rim of a hole in the whole

of the air. And it would further be thought, wrongly, that the rim would be immobile just so long as the whole of the air was immobile. When we ask what would make the whole of the air immobile, we wonder if an infinite regress is liable to arise. But Burnyeat satisfactorily answers this worry. Admittedly, the immobility of the air introduces the idea of its having an immobile place of its own which it does not change, and so invites inquiry about the immobility of that place. But the regress ends when we come to the immobility of the heaven as a whole. For the heaven as a whole is immobile, not through having and retaining a further immobile place, but through having no further surroundings and hence no place at all. By an irony its lack of a place, which Theophrastus is to present in his third and fourth puzzles as a possible source of weakness, is here a source of strength. Burnyeat is further able to show that Aristotle repeatedly speaks as if the heaven put an end to a related regress: your immediate place is on the earth, which is in the air, while the air is in the heavens. But the heaven as a whole has no further place.³¹

Of course, it has already been argued that such a scheme will not work as it stands. The immobility of the air rim surrounding a bird would not follow from the immobility of the air, and the task of redefining the immobility of the rim would require us to move a long way beyond Aristotle. On the other hand, Burnyeat's suggestion that Aristotle *thought* he could deal with place in the way described may seem to be confirmed by his confidence that immobile places will be available.

Theophrastus' third and fourth puzzles also concern rotation. They were repeated by Sextus³² and provided the Middle Ages with the second of the two major perplexities that Edward Grant discusses. But this time Aristotle had anticipated them. In his cosmos of concentric spheres, the heaven as a whole, and still more clearly the outermost of the celestial spheres in it, have no surroundings, and so have no place in the sense defined by Aristotle. Yet it seems that they need a place, since in rotating they change place. It is in this context that Aristotle offers the answer that the heaven as a whole does not change place, and so does not need place;³³ in rotation, only the *parts* of a sphere change place. Furthermore, the parts of the heaven have places, because one part surrounds another. This answer is accepted by Eudemos, Alexander, and Themistius, as noted above, but it is rejected by Simplicius and Philoponus, who insist that Aristotle repeatedly classifies rotation as a change of place.³⁴ One difficulty with the answer is that it does not deal with the outermost of the celestial spheres. Its parts do not seem to have surroundings against which they can move. For by talking of the surroundings (*periekhonta*) of a sphere, Aristotle has encouraged us to look at what lies beyond its outer surface, and nothing lies beyond the outer surface of the outermost sphere.

Besides arguing that the heaven does not need a place in the ordinary sense, Aristotle argues that in certain special senses it does have a place, although

none of these senses throws light on its rotation. For one thing, it can be said to be in place “accidentally,” because virtually all its parts (the inner spheres) are in place, and it is in place in virtue of them.³⁵ For another thing, it can be said, by adapting an idea in Anaxagoras and Plato, to be “in itself.”³⁶ But this latter location is not presented as one that changes, and so it too throws no light on how the heaven rotates. Moreover, the sense is admitted not to be primary (*prōtos*): a jar of wine can be said to be in itself merely because of an ambiguity according to which the expression “jar of wine” may refer now to the wine and now to the jar. Finally, the outermost sphere can be assigned a left, a right, an up and a down, on the basis of Aristotle’s functional definition of “right,” according to which right is the direction from which motion starts.³⁷ But this does not help either.

A new solution, however, is added to the discussion by Themistius, who argues that the outermost sphere and its parts are in place, though not strictly or without qualification, because they are “as it were” surrounded “in a way” on their *inner* side by the surface of the next sphere in.³⁸ This defence is rejected by Simplicius and Philoponus.³⁹ The latter complains that Aristotle describes a thing’s place as being outside it, as surrounding it and as being equal to it. Moreover, the penultimate sphere would be related to the outermost in two opposite ways, as providing its place and as receiving a place from it.

Theophrastus’ fifth and last puzzle is associated with our difficulties about river banks and comes close to a puzzle that is said to have been devised by the well-named John of Ripa in the fourteenth century.⁴⁰ If someone opens the door and creates a draft, the air surrounding me will move and I will be surrounded by different air and a different inner surface, and hence I will be in a different place, even though I have stood stock still. Clearly this puzzle is not after all genuinely new. It was illustrated above by the example of water being replaced around a boat, and it is not far from Theophrastus’ puzzle, that if my surroundings were removed, I should have lost my place even though I myself had not changed. Simplicius and Philoponus also come close to formulating John of Ripa’s objection.⁴¹ They describe the draft of air around me, Simplicius pointing out that the passage of water would do equally well. If they make it their conclusion not that I will have *changed* my place, but that in the absence of a suitable immobile surface, I will have *no* place, this is simply because they read Aristotle as requiring an *immobile* surface. Simplicius seems to associate the puzzle with Theophrastus by raising it immediately before citing Theophrastus’ puzzles.

A *partial* line of defence against John of Ripa’s version and against Theophrastus’s earlier second puzzle should by now have become clear. For a mere *rotation* around me of the surrounding air would not put me in contact with a different surrounding surface. And this supplies a reason, previously

missing, for the line of defence according to which Aristotle can afford to let places rotate, even though he cannot afford to let them move in a more thoroughgoing way.

For a fuller defense against John of Ripa and against Simplicius and Philoponus, we will have to appeal to Burnyeat's interpretation of Aristotle. For on that interpretation, Aristotle would say that I was always surrounded by an air surface whose immobility, despite local perturbation, was guaranteed by that of a vaster body, and ultimately by that of the heavens. But we have seen that such a defense would require a development that Aristotle does not give it.

Is Theophrastus' puzzle the same as the later ones? On the face of it, there seems to be a difference, because he appears to envisage a thing's surroundings being *removed altogether*, not merely *replaced*, and its ending up with no place at all. What is supposed to be paradoxical is its coming to have *no* place, despite not changing itself. But bizarre as the thought experiment may be, it is not clear why it should be thought paradoxical that the removal of *all* surroundings should suffice to deprive a thing of location. It is likely, therefore, that the puzzle Theophrastus intends is closer to the others and that he is thinking of replacing, not removing altogether, a thing's surroundings. The paradoxical result could then be that of Simplicius and Philoponus, that without changing itself, it loses *all* place, because it ceases to have an *immobile* body, as is axiomatically required, immediately surrounding it. Alternatively, it could be that of John of Ripa, that without changing itself, it exchanges its *mobile* place for a *new* one. Of these the former seems more likely, both because the paradox is expressed in terms of no longer being in a place, and because Theophrastus is said, like Simplicius and Philoponus, to take it as an axiom (*axiōma*) that place is immobile.⁴²

The fifth puzzle draws its sting from the fact that things would lose their place, *without their changing themselves at all*. It thus relates to the recorded views of Aristotle and Theophrastus on another issue. For Aristotle thinks that this sort of thing happens when a thing changes its relations, but not when it loses its place. In Book 3 of the *Physics*, he says that there are as many kinds of change (*kinēsis* and *metabolē*) as there are categories. But he clearly includes only four categories, for he also says that changing things (*metaballonta*) always change in respect of substance, quantity, quality, or place.⁴³ And this is confirmed in Book 5 of the *Physics* where he says that in respect of relatives there is no change, except accidental change (*kata sumbebēkos hē kinēsis*), which he has agreed to dismiss (*apheisthō* 224b27). There is no change because it is possible that, *without a thing's changing at all* (*mēden metaballon*), a different relational property becomes true of it.⁴⁴ The phrase "without changing at all" had been illustrated by Plato, who said that Socrates does not change when, through Theaetetus' growth, he comes next year to be shorter than Theaete-

tus.⁴⁵ And it seems to be common ground to Plato, Aristotle, and the Stoics that Socrates does not thereby change, except, Aristotle would say, accidentally.⁴⁶ But Simplicius disagrees, or is at least worried at *metabolē* being denied in this way,⁴⁷ and in two different works he cites in his support Theophrastus' definition of change (*kinēsis*). Theophrastus is like Aristotle in defining change as the actualisation of a potentiality, but he is unlike Aristotle in adding explicitly that this occurs "in every category."⁴⁸ Simplicius takes Theophrastus to mean more than the four categories allowed in Aristotle's earlier statement, and he also tells us that Alexander applies Aristotle's definition of change (*kinēsis*) to the category of relatives (*pros ti*).⁴⁹ What is the relevance of this to Theophrastus' fifth puzzle? It is that the puzzle uses the same description of the things that lose their place: they do so "*without changing themselves at all.*" Aristotle thinks that this sort of thing happens with relational change, but not with change of place. Theophrastus is said by Simplicius to disagree about relational change. Whether he does or not, we can now see that his fifth puzzle conceals an extra challenge to Aristotle, for it would extend the phenomenon even to cases of a thing's losing its place.

The two puzzles on which I have dwelt longest, the second and fifth, are both about the *immobility* of place. Aristotle's requirement of immobility is important, because it is the way in which he avoids a relativist view of a body's motion. By a relativist view I mean the view that motion is merely a body's acquiring a new spatial relation to another body. That would indeed mean that when the water moved past a moored boat, the moored boat would thereby move, because it would acquire a new spatial relation to the water. That Aristotle would reject such a relativist view is further confirmed by his distinction, just discussed, between motion and cases in which something acquires a new property without itself changing at all. The role of his requirement that a body's place should be immobile can be better seen when we ask what happens once reliance on immobile places is dropped. It is dropped, for example, by Ockham⁵⁰ and by Descartes.⁵¹ Descartes defines both place and motion in terms of a relation not to immobile bodies, but merely to bodies *regarded* as immobile. How, then, can it be denied that the moored boat moves in relation to the water?

Descartes reports a vulgar conception according to which a thing is moving only if there is in it an activity by which it moves.⁵² Leibniz reserves the designation "true motion" for the body that acts as a *cause* of motion,⁵³ and Berkeley reserves it for the body that has *force applied to it*,⁵⁴ although both regard true motion as only a species of relative. Modern physics can distinguish which of two bodies is moving if one is accelerating, while the other is not, but it is helpless if bodies move uniformly in relation to each other without acceleration. The references in these theories to activity, causation,

applied force, and acceleration reveal the kinds of alternatives that are needed once Aristotle's postulate of immobile places is discarded.

What was Theophrastus' role in connexion with the puzzles? He did not invent them all. The third and fourth on the place of the heavens are anticipated by Aristotle himself, and we have seen that the second on immobility was tackled also by another of Aristotle's younger associates, Eudemus of Rhodes. So we cannot be certain that Theophrastus invented any. Furthermore, the five are described by Simplicius as Theophrastus' *puzzles* (*aporein*), not his objections, so he may have hoped for, or supplied, answers, as Eudemus clearly did. On the other hand, it would be wrong to describe him, as he was once described in antiquity, merely as "touching lightly on those things that he knows to have been said by Aristotle before."⁵⁵ His importance in this connexion lies in his having assembled the puzzles together. This in turn will have encouraged the fuller and more formidable formulations and additional objections that we find later in Sextus, Simplicius, and Philoponus. I have given only a selection of these developments.⁵⁶

Theophrastus' assembling of puzzles may not only have encouraged further objections to Aristotle, but also opened the way for other theories of place to thrive. Greek philosophers after Theophrastus nearly all rejected Aristotle's definition of place. This is true of the next head of the Peripatetic school, Strato, and it is this fact, I believe, rather than ignorance of Aristotle, that explains the apparent failure of the Stoics to consider Aristotle's definition of place.⁵⁷ Why should they, once his school had abandoned the definition? The wrongness of Aristotle's definition is one of the points on which even the arch enemies Simplicius and Philoponus agree. Not only did later generations tend to think Aristotle's definition was wrong, but they were encouraged to accept rival conceptions that the puzzles would not threaten. The commonest idea was that place is an immobile, three-dimensional extension.⁵⁸ This and Proclus' view that it is an immobile, interpenetrating, three-dimensional body,⁵⁹ would be exempt from all the puzzles. Apart from Aristotle and his followers, Simplicius recognises only two exceptions to the view that place is three-dimensionally extended.⁶⁰

A striking feature of some of these rival theories of place is that in various ways they come closer to the idea of Newtonian space than Aristotle did, and they might indeed be called theories of space. Besides those who thought of space as a three-dimensional extension, a number thought that space could exist vacuously, empty of body.⁶¹ How many did so it is hard to say because of the obscurity of the idea, which is found in Philoponus and ascribed to Strato and to most Platonists.⁶² That idea, restated, says that space could exist without body, "so far as its own nature was concerned."⁶³ The most vivid parallel with Newton's views is found in those theories which allow the whole

of physical matter to move in empty space. Cleomedes reports the Stoic argument that we can imagine (*epinoēsai*) the whole physical cosmos being shifted,⁶⁴ and Epicurus postulates that all atoms fall downwards in the void.⁶⁵ The idea that space might be infinite was the least frequently anticipated of Newtonian views, partly, no doubt, because of the force of Aristotle's attack on more than finite quantities.⁶⁶ Renaissance readers of Greek texts found that they had to add the idea of infinity. But even here the Epicureans and Stoics were happy to make space infinite.

The liberation of antiquity from Aristotle's view is not always recognised. It is set into sharper focus by the contrast with the Middle Ages, which reverted to Aristotle. I have already cited the reports that Edward Grant gives of mediaeval efforts to rescue Aristotelian theory from the kind of objections we have been considering.⁶⁷ Grant further comments that the anti-Aristotelian conception of a space, void so far as its own nature was concerned, and containing all bodies, gained little support in the Middle Ages.⁶⁸ It was known through Averroes to have been Philoponus' conception, and it was with inspiration from Philoponus that Pico della Mirandola⁶⁹ reintroduced it in the sixteenth century. Yet we find Descartes still struggling with the Aristotelian legacy in his concept of extrinsic place as a surface belonging no more to the water than to the boat, and remaining the same, so long as the boat retains its relation to other bodies regarded as unmoving.⁷⁰ In contrast with this, Greek theorists show far less attachment to Aristotle, and it is my suggestion that this is partly due to the influence of Theophrastus.

DOUBTS ABOUT ARISTOTLE'S NATURAL PLACE

I now turn to Theophrastus' second fragment, in which he appears to switch from raising difficulties in Aristotle's definition of place to raising difficulties that concern his idea of *natural* place. Theophrastus still presents the difficulties as creating a puzzle (*aporia*), with a "perhaps" (*mēpote*), so his attitude toward them can only be conjectured.⁷¹ They are to the effect that place (*topos*) is not a reality in its own right (*kath' hautou ousia tis*), and represents no more than a way of talking about the physical parts of an organism and the arrangement (*taxis, thesis*) of parts dictated by the nature (*physis*) of the organism. On this view, to say that a dislocated arm is in the wrong place is only to say that its relation to the other parts of the body is contrary to that called for by the nature of the organism. It is not to say that there is such a thing as a place into which the dislocated arm has got itself. And this account can be extended from parts of the *body* to parts of the *cosmos* as a whole.

Theophrastus' downgrading of talk about place is best construed as a challenge to *natural* place, not to place in general. For his suggestion would

not cover the ordinary sense in which we say that a rock rolled along the ground has left its former place. At best it would only allow us to say that a rock had left its place, when it was thrown upwards into the air, contrary to the natural arrangement dictated by form. It is therefore easiest to suppose that Theophrastus believes some further conception of place is in play when we talk of things changing their place.

We have seen that Aristotle speaks of a left and right, up and down in the cosmos, but Theophrastus' suggestion goes far beyond that. Because we are talking about a part's *relation* to other parts, this has been called a relational account, the only relational account of space in Antiquity.⁷² It would be better to call it a relational account of *natural* place. To call it relational is not to say that it automatically implies what I have called a relativist account of motion, for it would remain to be seen whether there were criteria for saying that the arm had moved rather than the rest of the body. The quotation is again given by Simplicius:⁷³

Theophrastus too appears to have had this conception of place in his *Physics* when he continues his account in the form of a puzzle (*hōs en aporiāi*), and says: "Perhaps (*mēpote*) place (*topos*) is not a reality in its own right (*kath' hautou ousia tis*), but we speak of it because bodies have an order and position (*taxis, thesis*) through their natures and powers (*phuseis, dunameis*). And similarly in the case of animals and plants and in general of non-homogeneous things, whether animate or inanimate, if they have a nature that exhibits form (*emmorphos phusis*). For in these too there is an order and position of parts in relation to the whole being (*ousia*). And this is why everything is said to be in its own space (*khōra*) through having its proper order. For each part of the body too would desire and demand its space and position."

It is very natural for Theophrastus to extend his idea to the parts of the cosmos: earth, water, air, fire, and the heavens. For he likes to view the cosmos as an organism, and this has even been called the principal theme of one of his other works, the *Metaphysics*, where he says, for example, that the whole heaven has parts, and is as well fitted together as a city or an animal.⁷⁴ The word "heaven" here stands for the whole cosmos, as allowed by Aristotle,⁷⁵ not as it usually does for a part of the cosmos. Not only is it congenial to Theophrastus to think of the cosmos as an organism, but his suggestion would enable him to answer the question he put to Aristotle, how the heaven (in the narrow sense) can have a place. It does so because it has a natural relation to the other parts of the cosmos, a relation dictated by the nature or form of the cosmos. All this makes it plausible that he may have put forward his suggestion not as a puzzle to be refuted, but as something deserving serious consideration. Admittedly, it would make Aristotle's talk of natural places only a *façon de parler*. But that is not excluded by the report that Theophrastus himself speaks of natural places in the Arabic translations of his lost *Meteorol-*

ogy, which Hans Daiber has recently collected in India. It will be interesting to know what Theophrastus says about natural places when those Arabic texts have been translated and analysed.⁷⁶

The connection of place with organic parts was to have wide appeal, and once again I shall try to relate Theophrastus to a longer tradition. The connection is found not only in the Neoplatonist texts to be discussed below, but even in so antiteleological an author as Lucretius.⁷⁷ Moreover, Theophrastus' whole suggestion is the subject of an unexpected sequel in the Neoplatonist period. Simplicius claims that the Neoplatonist Iamblichus takes the same view of place as Theophrastus,⁷⁸ and that Theophrastus and Iamblichus in turn support his master Damascius.⁷⁹ The point of comparison is that Iamblichus makes a thing's place to be naturally united with it (*sumphues*), rather than external (*exōthen*), just as Theophrastus says that things have a place dictated to them by nature (*physis*, cogn. *sumphues*), which is not merely accidental to them.

I shall return to this comparison, but first I should issue the warning that it overlooks a very big difference: Iamblichus restores to place the independent reality and power of which Theophrastus had drained it.⁸⁰ It is⁸¹ or has⁸² power (*dunamis*), a power that acts (*drastērios dunamis*), for it is not inactive or inert (*adranēs*, *argos*). In particular, it stops bodies from spreading and being dissipated and draws them together (*sunagei*),⁸³ and it holds up (*anechei*) bodies that would fall.⁸⁴ The idea of holding up is the idea of preventing bodies from descending into prime matter, which is both the lowest thing in the metaphysical hierarchy and the thing which, by being spread out and dissipated, is furthest removed from the unitary character of the One at the top. By holding up bodies and preventing their dissipation, place gives them their very existence.⁸⁵

Given this *dynamic* conception of place, Iamblichus has to reject the view that place is a bare extension (*diastēma psilōs*),⁸⁶ or, as the Stoics said, something that merely supervenes upon bodies (*paruphistasthai*),⁸⁷ or, as Aristotle might be taken to mean, the bare boundary of a thing's surroundings (*to peras tou periechontos psilon*).⁸⁸ Iamblichus can accept Aristotle's description "boundary" (*peras*) if it is taken as implying cause and origin (*aitia*, *archē*). And he can accept his talk of surrounding (*periechein*) if it is not a merely external surrounding (*exōthen*), but something connected with holding bodies up (*anechein*).⁸⁹ There had been a tradition of giving the idea of surrounding or embracing (*periechein*) a dynamic connotation ever since the early pre-Socratics Anaximander and Anaximenes had connected it with governing (*kubernan*)⁹⁰ and controlling (*sunkratein*).⁹¹

Only two sources are named as encouraging Iamblichus to take his dynamic view of place. Simplicius emphasizes the influence of the neo-Pythagorean pseudo-Archytas, although he is not quoted as saying more than that place has

a certain priority because it must exist first, in order that other things may exist, move, and be moved in it.⁹² Iamblichus himself cites the fact that Plato connects space in the *Timaeus* with Creation.⁹³ But there is another motive for his dynamic theory. Simplicius repeatedly calls it the “intellective theory” (*noera theoria*) of place. It forms part of Iamblichus’ grand design of defending the harmony of Plato and Aristotle against Plotinus’ attack. Plotinus had charged that the Aristotelian scheme of categories could not apply to the world of intelligible things such as Forms.⁹⁴ Iamblichus’ intellective theory responds that the dynamic conception of place as what preserves a thing by surrounding it applies, and applies first and foremost, to the intelligible world.⁹⁵ Plotinus himself had treated what a thing is *in* as preserving it. Reversing the expected relation, but following Plato in this, Plotinus made the world’s body to be in the World Soul in this way, as well as the World Soul in the Intellect and the Intellect in something else.⁹⁶ And Iamblichus is credited with just these examples of cosmos in Soul and Soul in Intellect, along with others.⁹⁷ It is because the concept of place has so many other applications that a dynamic conception is required to fit all the cases.⁹⁸

So much for the dynamic character of place as Iamblichus conceives it. From its filling bodies with its power Simplicius draws an inference. It is not separate, he conjectures, from what is in place.⁹⁹ And elsewhere, without referring to Iamblichus, he takes nonseparateness to mean that this sort of place moves with the body when it moves:¹⁰⁰

They think that place is immobile (*akinēton*), because they concentrate on this broad, shared (*en platei, koinos*) place. For the unique (*idios*) place of a thing which is essentially united (*sunousiōmenos*) with it certainly moves with it (*sunkineitai*), but the shared place which is thought of as broad stays still (*menei*), as being unique to a more universal and embracing (*holikōteron, periektikōteron*) body.

Now the place which is unique (*idios*) to the position (*thesis*) of the parts of a thing is both inseparable (*achōristos*) from the thing and moves with it (*sunkineitai*) when it moves. But, as Syrianus himself used to say, the broad place which is involved in motion from place to place, is unique to a different body, the more universal one, and is inseparable from that, and moves with it, if it should chance to move, whereas it is both separable from the body contained within it and immobile in relation (reading: *hōs pros*) to it.

By suggesting that a body’s place moves with it, Simplicius unites it with that body in a far stronger sense than Theophrastus ever intended. We saw that for Theophrastus the nature of the cosmic organism calls for a rock to stay at ground level, but that nonetheless the rock can still be tossed into the air. On Simplicius’ extrapolation from Iamblichus, by contrast, a body’s unique place is united with it in such a sense that the body can never leave that place. It is therefore a tenuous connexion that Simplicius finds between the two

philosophers when he says that both think of a thing's place as naturally united with it.

Dynamic views of place are found in four subsequent Neoplatonists, Syrianus¹⁰¹ and his pupil Proclus,¹⁰² Damascius and his pupil Simplicius. But I shall move straight on to Damascius, because he is the next to be explicitly associated with Theophrastus. Damascius reaffirms much of what has been said. He agrees with Iamblichus that place has the power to draw things together (*sunagōgos*).¹⁰³ As quoted and elaborated by Simplicius, he also repeats Theophrastus' references to the arrangement of an animal's parts,¹⁰⁴ and he compares the parts of the cosmos, while at the same time speaking of a kind of position (*thesis*) that is naturally united (*sumphutos*) with a body's essence:

One kind is naturally united (*sumphutos*) with essence (*ousia*), as for example in my body my head's being up and my feet down. The other is adventitious, as when I have my position sometimes in the house and sometimes in the market.¹⁰⁵

Simplicius interprets the comparison with an organism as applying to place (*topos*), as well as to position (*thesis*):

So it is because of place, which arranges each of our parts well (*euthetizōn*), that my head has come to be on top of my body and my feet below. And the liver is on the right, the heart in the centre, the eyes by which we see when moving forward are in front, and the back on which we carry loads is behind.—It is also because of place, then, that the parts of the cosmos have their proper good arrangement (*euthetismos*) in the universe.—As the parts of the earth and of the heaven are variously arranged (*tetaktai*) here and there because of place, and some are, it may be, in the North, others in the South, so it is because of place that the whole heaven and the whole earth, which are parts of the cosmos, have the correct measurement (*eumetria*) of their position and the cosmic ordering (*diakosmēsis*) which falls to them, with one occupying the circumference of the universe and the other its centre.¹⁰⁶

In the same passage, and elsewhere, Simplicius compares place with *time*, which also arranges things, separating the Trojan and the Peloponnesian war so that they will not collide.¹⁰⁷ Because of its active powers, place is not a mere boundary, nor a mere extension.¹⁰⁸ Nor yet is Proclus right that place is a body, for it would then need another place to arrange its parts.¹⁰⁹

So far, much of what Damascius says is familiar. But he adds the new idea that place should be viewed as a measure. He distinguishes the positioning (*thesis*) of an organism's parts from the place (*topos*), which he regards as a measure (*metron*) of that positioning,¹¹⁰ where a measure is something that prevents indeterminateness.¹¹¹ He thinks of place (although this time Simplicius does not agree) as a measure not only of positioning, but also of size, and

as giving things the right size.¹¹² Elaborating an idea of Proclus, he compares the measure to a sort of outline (*proupographē*) or mold (*tupos*), into which the organism should fit, if it is to lie properly. The following is a direct quotation:

Place is as it were a sort of outline (*proupographē*) of the whole position (*thesis*) and of its parts, and so to say a mould (*tupos*) into which the thing must fit, if it is to lie properly and not be diffused, or in an unnatural state.¹¹³

Simplicius explains that the outline or mold is a flexible one, so that it can allow for a variety of positionings, as it does in the case of the moving heavens.¹¹⁴ Since place measures positionings in this way, Simplicius describes it as an arranger or arranging (*euthetizōn*, *euthetismos*).¹¹⁵ He explains that there are three elements in measuring: the thing measured, the measure or physical instrument of measuring, and the unit in the world of Forms by which the measuring is done.¹¹⁶ The last is unextended, and perhaps this is why Damascius regards place as unextended.¹¹⁷ But Simplicius, though agreeing that place is a measure,¹¹⁸ does not agree with the denial of extension.¹¹⁹

In giving his own views, Simplicius exploits Damascius' distinction of adventitious position, and thus enables himself to go beyond the fragment of Theophrastus, and to give an account not only of natural place, but of any place to or from which a body may move. We have seen how Damascius distinguishes the positioning (*thesis*), which is united by nature (*sumphutos*) with a thing's essence and is permanent, like my head's being above, my feet below, from an adventitious position (*epeisaktos thesis*), like my being in the house or in the market place.¹²⁰ Simplicius infers that places (*topoi*) as well as positions can be adventitious or united by nature,¹²¹ and he adds a different, though related, distinction already noted: one kind of place is unique to the individual (*idios*) and moves with it when it moves. Another kind of place can be shared (*koinos*), and abandoned in favour of a new one.¹²² The shared kind includes both a thing's *immediate* place, which is presumably adventitious, and such broader places as the earth or some part of it, which may be the proper place of land animals.¹²³ These distinctions are what facilitate a general account of all place and motion. First, the shared place that I occupy, for example the place of the air, though not unique to me, will be unique to the whole air, and would move with the air if it moved.¹²⁴ As for the immediate place within the air that I occupy, that has no permanent existence, but perishes when I leave it. But the place of the whole air retains the ability again to fit me into some part of itself, and when it does so, it will in that part have the same measure as my extension and will measure my extension again.¹²⁵

In some of his statements, Simplicius merely confirms what has already been said. Place draws bodies together¹²⁶ and arranges them,¹²⁷ as time

arranges events.¹²⁸ Theophrastus' appeal to animal parts is repeated,¹²⁹ and places are said to be boundaries (*perata*) only in the active sense (*drastikon*) of giving definition (*horistikon*) to the things they belong to.¹³⁰ But as he elaborates Damascius' view (and it is often hard to say where Damascius' ideas stop and Simplicius' begin), the resulting concept of place begins to look quite unfamiliar. Going beyond Theophrastus, he is able to say not just that the heaven, but that the whole cosmos, has a place, namely, when its parts have their proper arrangements.¹³¹ Again, although place is three-dimensionally extended, it is unlike the immobile three-dimensional extension that so many post-Aristotelian philosophers identified with place. For, as we have seen, immediate place is subject to perishing, and unique place is subject to motion: immobility is not required.¹³² Moreover, Simplicius thinks of place not as an extension (*diastasis*), and hence as something in the category of quantity, but as a substance or essence (*ousia*) that is extended.¹³³ In fact, Simplicius has the problem that unique place seems to be in competition with the essence or form of a thing.¹³⁴ It had been, and was in Theophrastus, the role of an organism's form or essence to arrange its parts and control its size. Theophrastus left the job to form (*emmorphos phusis*) and downgraded place.¹³⁵ If Simplicius does the reverse and transfers the job to place, what role is left for form? Simplicius says that form is not orderly (*euthetos*) on its own without place, any more than it is perfect without perfection.¹³⁶ He admits that on this conception the essence and the place of a thing become hard to distinguish (*dusdiakritos*),¹³⁷ even though they are not the same. We could hardly be farther away from Theophrastus:

In the same way it [the form: *eidos*] also has its position ordered with a good configuration because of place. So let us not seek to separate the form from the participation in the spatial which is essentially united with it and to see it as well arranged in its own right. That would be just like our separating its perfection from it in thought and nonetheless insisting on regarding it as perfect even without. So this statement says nothing in opposition to the one which denies that place is form, even if it says that place is connected with form.¹³⁸

I come now to the last person in the story. For although Simplicius claims that his predecessors are in the tradition of Theophrastus, it is in fact someone else who, for natural places, comes closest to Theophrastus' suggestion: I mean John Philoponus. He comes close in two contexts: in one, he is defending the conceivability (though not the actual existence) of a vacuum against Aristotle's charge that a vacuum would not be differentiated in such a way as to explain differentiated natural motions.¹³⁹ In the other context, Philoponus is defending his own quite un-Theophrastean conception of place as a three-dimensional extension against a similar charge from the Aristotelian camp: how can this extension, whose definition would allow it to be vacuous, have the power (*dunamis*) by which heavy and light things seek their proper

places?¹⁴⁰ In both contexts Philoponus denies any power to place. He explains natural motions by appealing, like Theophrastus, to the parts of animals and comparing the cosmos as being a great animal with parts. It is the arrangement of parts in relation to each other that explains natural motion, not some power belonging to different places.¹⁴¹ Philoponus ridicules the idea that the elements could be striving to reach an Aristotelian place, that is, the surface of their surroundings. His view, in sympathy with Theophrastus', is teleological: it is for their own good and for that of the cosmos that the parts seek their proper arrangement. But he adds his belief in the Creator: it is he who assigned the arrangement. The agreement with Theophrastus concerns only Philoponus' view of *natural* place, not his view of place in general. But he does offer a complete repudiation of the Aristotelian and Neoplatonist ascription of power (*dunamis*) to places.¹⁴² The two passages run as follows:

I reply to the present point that first and foremost there is no need for the place which receives each body to have any power (*dunamis*) or quality. The fact that it is good for each thing to be thus and so does not mean that any power need be stored in the place where it naturally resides. Aristotle himself would not say the fact that the celestial body is arranged with a circumference and that this is good for it means that the surface (reading: *tēn*) at the circumference has a power and that the celestial body is arranged with a circumference, because it seeks (*ephietai*) this surface. After all, he does not even think that the surface (reading: *tēn*) at the circumference is a place. So I deny that the celestial body occupies this part of the void or (better) of extension, that is, the extreme part at the circumference, because this part has some power. Rather it is because it is the nature of the heaven to embrace everything in its circumference and to contain everything within itself. Because this is its nature, then, it is to be expected that it occupies the corresponding part of space (*khōra*). So it is a result that happens not because of a power especially belonging to extension. The heaven occupies the outermost part of extension, because this is its nature—I mean, to surround all things. It is like the case of the generation of animals: each different part is in contact with a different part of space, whether the latter be the boundary (*peras*) of the surroundings as Aristotle thinks, or an extension, as I think and reason shows. For example, the head is in contact with this part of the surface (*epiphaneia*) of the air, even if the air is not actually divided, and the hands and feet and so on are each in contact with a different part. Certainly, no one says that the boundary of the air in contact with the head, as distinct from that in contact with feet or hands, has a certain power, and that because of this, in search of (*epheisis*) that boundary, the head occupies this air-boundary and another part occupies another air-boundary. Rather, what is said is that the head's nature is to be on top of the rest of the body and that different parts of the body are differently arranged because this is good for the animal. It merely happens as a result of this that the head is in contact with this boundary and another part with another, although the air contains no differences in relation to itself. I say this also about the universe, for the cosmos is a great animal. Because it was good for the arrangement of the whole cosmos that the bodies which fill it up should have this sort of relation to each other, and because each body has as its natural impulse

(*hormē*) the search for this sort of relation to the others, and because it achieves this result when it occupies this part of extension, it is to be expected that each body seeks this result, not because that part of extension has some power, but because good accrues to the universe and its identity and well-being to each part, when it goes beneath this part and on top of that. So it seeks a spatial extension not to obtain that extension, but to obtain a certain relationship to the other parts.¹⁴³

It is quite ridiculous to say that place has a certain power in its own right. For things move to their proper places not in search of a surface, but in search of the arrangement (*taxis*) they obtained from the Creator. So because earth was arranged in the extreme position, beneath everything else, water in the second, air and fire in the third and fourth, it is to be expected that, when something is dislodged from this arrangement, and what is naturally on top of another thing is put by some force beneath it instead of on top, they will move in search of the arrangement allotted by the Creator far enough to be in that arrangement again. So light things move up, not seeking simply to be in contact with the surface of their surroundings, but in search of the arrangement which the Creator assigned them. For then they most fully have their identity and they have their perfection then. So place does not have any power by which bodies are moved to their proper places, but the bodies seek to preserve their arrangement.¹⁴⁴

Philoponos appears here as a true upholder of Theophrastus. But what separates the two of them from Iamblichus and the Athenian Neoplatonists is only an example of a wider disagreement in Greek philosophy as to whether place has any power. In particular, there was disagreement about whether it had the power to sort the four elements into regions natural to them. Many would be on Theophrastus' side. Theophrastus' successor Strato throws out the whole idea: all the elements are heavy, and even fire would fall if you removed all the elements beneath it. What makes fire rise is not a natural place, but mere *ekthlipsis*—its being squeezed upwards by the other elements.¹⁴⁵ Theophrastus' contemporary Epicurus, founder of the rival atomist school in Athens, also rejects the idea of natural places, and also appeals to *ekthlipsis*.¹⁴⁶ Indeed, the idea of *ekthlipsis* had already been employed by the earlier atomists Leucippus and Democritus.¹⁴⁷

Of course, these thinkers are unlike Theophrastus in that they remove organising power from place, not in order to assign it to something else, but in order to replace it with the blind forces of chance and necessity. But there is a much closer sympathy between Theophrastus and the Stoics. The Stoics do not have to address themselves to the view that *place* has any influence on motion, once Theophrastus has questioned the idea and Strato abandoned it. And once again it is this, rather than ignorance, I believe, that explains their silence on Aristotle's natural place.¹⁴⁸ In fact, for the Stoics, neither filled place (*topos*) nor empty place (*kenon*) *can* act or be acted on, because this is possible only for *bodies*.¹⁴⁹ Because of that in turn, non-bodies are downgraded into not

having being at all (they are not *onta*),¹⁵⁰ and this is applied to *place*, which is treated as a mere something (*ti*), instead of as a real being (*on*).¹⁵¹ Chrysippus makes all bodies tend to the center of the cosmos because of powers that are lodged in *bodies*, not in *places*, that is, because of a holding power that is identified with *pneuma*, the all-pervading gas that holds things together by its centripetal motions.¹⁵² The Stoics, like Philoponus, also go further than Theophrastus in their organic view, since they say that the cosmos actually is a living organism. The second head, Cleanthes, makes it the vital heat of the cosmos which holds its parts together (*continere*).¹⁵³ And his successor, Chrysippus, says, in the very context of discussing motion towards the center, that the parts of the cosmos exist only as parts of the whole, that the coordinated arrangement (*suntaxis*) of the cosmos is the cause (*aitia*) of the movement towards the center, and that any part of the cosmos is naturally united (*sumphues*) with the rest.¹⁵⁴

Plato's view of space had been more nuanced. Talking in the *Timaeus* of the prototypes (vestiges, *ichnē*) of the four elements during the original period of chaos, he says that his Receptacle, or space (*chōra*), shakes them like a winnowing fan and so distributes them into their four regions.¹⁵⁵ On the other hand, the power of space to do this is not an active power: it shakes the elements only because it is itself swayed by the qualities it receives. How it can be swayed and shake the elements is a problem that worries commentators, because it is also said to be subject to no change.¹⁵⁶ Insofar as Plato does make the Receptacle sort the elements, he has less influence than might be expected on discussions of space, because a good many ancient authors think that he calls the Receptacle space only as a metaphor or analogy.¹⁵⁷ It is the Neoplatonists who are the most whole-hearted in ascribing power to place, and among various other powers, four of them assign it the power discussed by Plato of moving and sorting the four elements into their regions: Syrianus,¹⁵⁸ Proclus,¹⁵⁹ Damascius, and Simplicius.

We may ask finally what sympathy we can retain in modern times for the debate about the power of natural place. Of course the whole idea of natural places for the elements lost its justification when Copernicus' view replaced Aristotle's geocentric conception. But it has been claimed that Copernicus retained an analogue of natural places,¹⁶⁰ and the idea is still found in Descartes.¹⁶¹ In some expositions of contemporary physics, the idea is expressed that space itself can have power: it is the geometry of space that deflects bodies in the phenomenon we call gravity, although matter also has power, since it gives space its geometry.¹⁶² But more recent expositions of the General Theory of Relativity tend to treat the causal language as inappropriate¹⁶³ and speak merely of a functional relation between the geometry of space, the distribution of matter, and the phenomenon of gravity.¹⁶⁴

NOTES

1. Aristotle, *Cat.* 6, 5a8–14: the parts of a place are occupied by (*katechein*) the parts of a body, and share a common boundary with them. Averroes notes that this conception differs from that in the *Physics*.
2. Aristotle, *Cael.* 4.3, 310b3.
3. Aristotle, *Phys.* 4.8, 215a9–11, cf 214b17–19; 214b28–215a1. Upper and lower parts would not be actually present, in his view, if there was nothing to mark them.
4. Aristotle, *Phys.* 4.8, 214b12–17.
5. Aristotle, *Phys.* 4.1, 208b11.
6. The denial at Aristotle, *Phys.* 4.1, 209a20 that place can serve as any of the four causes, or four modes of explanation, is merely part of a puzzle or *aporia*.
7. See Aristotle, *Cael.* 2.3, 285a15f; b3ff; *LA* 4, 705a28–b18; 706a13ff; *PA* 2.10, 656a13; 4.7, 683b19–25; 4.8, 683b35; *Juv.* 1, 467b31–4; 468a2–5; *Phys.* 4.1, 208b15, with G.E.R. Lloyd, "Right and left in Greek Philosophy," *Journal of Hellenic Studies* 82, 1962, 56–66, and James G. Lennox, "Theophrastus on the limits of Teleology," in W. Fortenbaugh, ed., *Theophrastus of Eresos, on his Life and Work*, Rutgers University Studies in Classical Humanities 2, New Brunswick 1985.
8. Aristotle, *Phys.* 4.4, 211a24–b4; 212a2–7; 212a29–30; cf 4.5, 212b19.
9. Aristotle, *Phys.* 4.4, 211b9–29.
10. The two ideas are presented in the same contexts. See Aristotle, *Cael.* 4.3, 310b7–11; *Phys.* 4.1, 208b11; 4.4, 211a3–6; 4.5, 212b29–213a10 (a passage missing, however, from the text read by Themistius); 4.8, 214b12; 215a8–11.
11. Edward Grant, "The medieval doctrine of place: some fundamental problems and solutions," in A. Maierù and A. Paravicini Bagliani, eds., *Studi sul XIV secolo in memoria di Anneliese Maier*, Rome 1981, 57–79.
12. Aristotle, *Phys.* 4.4, 212a14–21.
13. Aristotle, *Phys.* 4.4, 212a29–30; cf 4.5, 212b19.
14. Aristotle, *Phys.* 4.4, 211a2; a27–9.
15. Myles Burnyeat, "The sceptic in his place and time," in Richard Rorty, J.B. Schneewind, Quentin Skinner, eds., *Philosophy in History*, Cambridge 1984, n.15.
16. Aristotle, *Phys.* 4.4, 212a20.
17. Thomas Aquinas, *In Phys.*, in Lib. 4, Lectio 6, translated by Richard J. Blackwell, Richard J. Spath and W. Edmund Thirlkel, London 1963, paragraphs 468–9.
18. Edward Grant, *op. cit.*
19. Descartes, *Principles of Philosophy* 2.15.
20. Aristotle, *Phys.* 4.3, 210b22–7; 4.5, 212b27–9.
21. Aristotle, *Phys.* 6.10, 240b17; cf *DA* 1.3, 406a6–12.
22. Simplicius, *In Phys.* 604,5–11.
23. Simplicius, *In Phys.* 604,33–605,2; cf 604,21–8; Philoponus, *In Phys.* 564, 3–14.
24. Newton, Scholium to definitions at the end of the first section of *Principia* III.
25. Simplicius, *In Phys.* 603,28–604,5; 605,26–35; 606,32–607,9; Philoponus, *In Phys.* 564,14–565,1.
26. Aristotle, *Phys.* 4.4, 212a21–4.
27. Aristotle, *Phys.* 4.5, 212b20.
28. Aristotle, *Phys.* 4.5, 212a34–b1; *GC* 1.5, 320a21–4.

29. Eudemus *ap.* Simplicium, *In Phys.* 595,8–9.
30. Alexander *ap.* Simplicium, *In Phys.* 589,5–8; 595,20–1; 602,31–5; Themistius, *In Phys.* 120, 17–19.
31. Aristotle, *Phys.* 4.4, 209a32–b1; 211b28–9; 212a21–4; 4.5, 212b17–22; *Cael.* 4.3, 310b10–11.
32. Sextus, *M* 10,30–6.
33. Aristotle, *Phys.* 4.5, 212a31–b17, esp. 212a31–b1; 212b11–13; cf. *GC* 1.5, 320a21–4.
34. Simplicius, *In Phys.* 595,16–26; 602,35–603,17; Philoponus, *In Phys.* 565,1–8; 14–16.
35. Aristotle, *Phys.* 4.5, 212b11–13. Eudemus and later commentators expand on the point by saying that the heaven is in its parts in the sense that it cannot be separated from them, and its parts are (most of them) in place: Eudemus *ap.* Themistium, *In Phys.* 120,2–3 and *ap.* Simplicium, *In Phys.* 595, 14–16; Themistius, *In Phys.* 120,31–2; Simplicius, *In Phys.* 592,35–593,3; Philoponus, *In Phys.* 603,8–10.
36. Aristotle, *Phys.* 8.6, 259b26; 4.3, 210a25–b22. Cf Anaxagoras *ap.* Aristotelem, *Phys.* 3.5,205b1–24; Plato, *Parmenides* 138A–B; 145B–E.
37. Aristotle, *Cael.* 2.2, 285a22–b33.
38. Themistius, *In Phys.* 121,2–4; 8–11, repeated *ap.* Simplicium, *In Phys.* 592,22–4.
39. Simplicius, *In Phys.* 590,27–32; 592,25–7; Philoponus, *In Phys.* 565,21–566,7.
40. Edward Grant, *Much Ado About Nothing*, Cambridge 1981, 125.
41. Simplicius, *In Phys.* 604,3–5; 607, 1–2; Philoponus, *In Phys.* 564,19–23.
42. Simplicius, *In Phys.* 606,32–4.
43. Aristotle, *Phys.* 3.1, 200b33–201a9.
44. Aristotle, *Phys.* 5.1, 225b11–13 (= *Metaph.* 11.12, 1068b11–13; cf. *Phys.* 5.1, 224a21–2; b26–7); 7.3, 246b11–12; 247b4.
45. Plato, *Theaetetus* 155B–C.
46. For the Stoics, see Simplicius, *In Cat.* 166,17–29; 172,1–5.
47. Simplicius, *In Phys.* 861,5–28, would rather Aristotle had made a terminological distinction, allowing *metabolē*, while denying *kinēsis*. See Concetta Luna, “La relation chez Simplicius,” in I. Hadot, ed., *Actes du Colloque Simplicius*, Peripatoi, de Gruyter, Berlin, forthcoming.
48. Theophrastus *ap.* Simplicium, *In Phys.* 860,19–861,4; *In Cat.* 435,28–31.
49. Alexander *ap.* Simplicium, *In Phys.* 409,24–32. Alexander adds that when one thing is reduced in size, to become half the size of another, the change (*kinēsis*) is in *both* of them (even though, confusingly, only one is changed—*kekinētai*), because it is one and the same potentiality that is actualized in the thing that is potentially double and the thing that is potentially half.
50. See Edward Grant, “The medieval doctrine of place,” 67–71.
51. Descartes, *Principles of Philosophy* 2.13 and 2.25. We may well end by thinking that no such genuinely unmoving points are to be found in the universe.
52. Descartes, *Principles of Philosophy* 2.24.
53. Leibniz, *5th Letter to Clarke* §53, ed. Alexander, p.74.
54. Berkeley, *Principles of Human Knowledge* §§113–15.
55. Boethius, *In Int.* (2), ed. Meiser, 12,9–12.
56. Sextus, e.g. *M* 10.30–6; 55–6; *PH* 3.131; Simplicius, *In Phys.* 601,25–610,22; Philoponus, *In Phys.* 563,26–567,29.

57. I diverge here from Sandbach's important book, in which he argues from Stoic silence on various issues to their ignorance of Aristotle: F.H. Sandbach, *Aristotle and the Stoics*, Cambridge Philological Society, supp. vol. 10, 1985.
58. For place as extension in Epicurus, see e.g. *Letter to Herodotus* 39–40; Lucretius 1,419–44; Sextus *M* 10.2; Themistius, *In Phys.* 113,11; Simplicius, *In Phys.* 571,24–5. For the Stoics, e.g. Sextus, *M* 10.3; Themistius, *In Phys.* 113,11; Simplicius, *In Phys.* 571,24–5. For Strato, Simplicius, *In Phys.* 601,24; 618,24; Aëtius, *Placita* 1.19 in Diels, *Dox. Gr.* 317. For Galen, Themistius, *In Phys.* 114,7; Simplicius, *In Phys.* 573,19–32, Philoponus, *In Phys.* 576,13. For most Platonists, Simplicius, *In Phys.* 601,24; 618,24. For Philoponus, his *Corollary on Place*, at *In Phys.* 557,8–585,4. For a report, *without attribution*, Syrianus, *In Metaph.* 84,27–86,7. I have not personally been convinced by an alternative interpretation of Epicurus, which should, however, be studied in the skillful formulation of Brad Inwood, according to which place or void should be viewed not as an extension, but as an ideal fluid which flows round the edge of solid atoms. See Brad Inwood, "The origin of Epicurus' concept of void," *Classical Philology* 76, 1981, 273–85.
59. Proclus, *Commentary on Plato's Republic*, vol. 2, p.198, lines 8–15, and *ap.* Simplicium, *In Phys.* 611,10–618,25.
60. Simplicius, *In Phys.* 601,16–19.
61. Of those listed above as making place extension, the following allow vacuum to exist, some inside, some outside the cosmos, and some in microscopic pockets: Epicurus, the Stoics, probably Galen, Strato (*ap.* Simplicium, *In Phys.* 693,11–18), and in addition Hero of Alexandria who has a passage corresponding verbally to one of Strato's (Hero, *Pneumatics*, introduction).
62. Philoponus, e.g. *In Phys.* 579,6–9 (see also the *Corollary on Void*, at *In Phys.* 675,12–695,8). Strato and the Platonists, reported by Simplicius, *In Phys.* 601,24; 618,24.
63. David Sedley, "Philoponus' Conception of Space," in Richard Sorabji, ed., *John Philoponus and the Rejection of Aristotelian Science*, London and Ithaca, N.Y. 1986.
64. Cleomedes, *De motu circulari corporum caelestium* 1.1.3.
65. Epicurus, *Letter to Herodotus* 61; Aëtius 1.12.5; Lucretius 2,216–42. Cf Proclus, who believes that the whole spherical cosmos rotates against a space which is, however, itself physical: Proclus, *In Rempublicam* 2.197,17–198,4 (Kroll); *ap.* Simplicium, *In Phys.* 612,32–5.
66. Aristotle, *Cael.* 1, 5–7; *Phys.* 3, 4–8.
67. Edward Grant, "The medieval doctrine of place" *loc. cit.* n.11.
68. Edward Grant, *Much Ado About Nothing*, Cambridge 1981, 19.
69. Edward Grant, *Ado* 19; Charles Schmitt, *Gianfrancesco Pico della Mirandola (1469–1533) and his Critique of Aristotle*, The Hague 1967, ch.5.
70. Descartes, *Principles of Philosophy* 2.15.
71. I am grateful to David Sedley for pressing this point in his reply to me at the fourth International Conference of Project Theophrastus. I will leave it to him to explain his own conjecture about the intended thrust of the puzzle.
72. Sambursky, *The Physical World of Late Antiquity*, London 1962, 13; *The Concept of Place in Late Neoplatonism*, Jerusalem 1982, 13; Max Jammer, *The Concept of Space*, Cambridge, Mass. 1954, 21. In making place, so far as it exists at all, relative to bodies, Theophrastus has nothing in common with modern physical theory. That makes space relative to frames of reference, but not to bodies, the

idea of which comes to be replaced at the subatomic level by that of spatially extended fields.

73. Simplicius, *In Phys.* 639,13–22.
74. Theophrastus, *Metaphysics* 8a5. So Marlein van Raalte, “The idea of the Cosmos as an Organic Whole in Theophrastus’ *Metaphysics*,” in the present volume. Theophrastus further assigns soul to the celestial spheres, and wonders whether the lower elements should not be assigned soul, and whether they are not *parts* of the heaven (in the wide sense), rather than suffering merely accidental effects from the celestial rotation, 5a28–b26.
75. Aristotle, *Cael.* 1.9, 278b9–21.
76. Arabic text and translation are forthcoming in *Rutgers Studies*.
77. Lucretius, 5, 540: the earth stays in its place without weighing down the air beneath, because it is like a head which does not weigh down a neck.
78. Simplicius, *In Phys.* 639,10. Pending the appearance of new translations of the Neoplatonist commentators on Aristotle, the main Neoplatonist texts on place can be found translated in S. Sambursky, *The Concept of Place in Late Neoplatonism*, as above.
79. Simplicius, *In Phys.* 642,17.
80. Here I must dissent from the very helpful article of Philippe Hoffmann, “Simplicius: Corollarium de loco,” in *L’Astronomie dans L’Antiquité Classique*, Actes du Colloque tenu à l’Université de Toulouse-le Mirail, (Paris 1979), 143–63, p.158, n.18.
81. Simplicius, *In Phys.* 640,3.
82. Simplicius, *In Cat.* 361,15–18; 362,19.
83. The point is put in several ways. It draws bodies together (*sunagein*), Simplicius, *In Phys.* 640,4; 11; it does not allow their dissipation (*diastasis*) to proceed indefinitely, Simplicius, *In Cat.* 361,18–20, but holds together their dissipation (*sunechein diastasin*) 362,4; it surrounds or embraces them (*In Phys.* 640,5; 10; *In Cat.* 361,33–362,4; 362,16–18), and gives them a boundary (*aphorizein*, *sumpe-rainein* 361,15; *horizein* 361,20; *In Phys.* 640,11).
84. It holds them up (*anechein*, *In Phys.* 640,13; *In Cat.* 362,23; 25–6); props them up (*diereidein*, *In Phys.* 640,4); raises those that fall (*anegeirein piptonta*, *In Phys.* 640,4; *In Cat.* 362,26); fills them (*sumplēroun*, *In Phys.* 640,5; 9); fills them with a power that raises them (*plēroun anegeirousēs dunameōs*, *In Cat.* 362,25).
85. Simplicius, *In Cat.* 362,1–2.
86. Simplicius, *In Phys.* 639,29–30; *In Cat.* 362,18.
87. Simplicius, *In Cat.* 361,10; 27–8.
88. Simplicius, *In Phys.* 639,29; *In Cat.* 362,10; 24; 27–33.
89. Simplicius, *In Cat.* 361,30–362,4; 362,10; 16–19; 24; 27–33.
90. Aristotle, *Phys.* 3.4, 203b7. The “Boundless” (*apeiron*) which surrounds and governs might sound like the very opposite of Iamblichus’ boundary (*peras*), but the correction according to which the boundless or infinite (*apeiron*) is not well qualified to surround or embrace (*periechein*) had been supplied in the interim by Aristotle, *Phys.* 3.6, 206b33–207a2; 3.7, 208a3.
91. Anaximenes, fragment 2, Diels-Kranz. Alexander connects it with preserving (*sōzein*, *Mixt.* 223, 9–14). Cf Empedocles, frag. 38.4, Diels-Kranz; Plato, *Ti-maeus* 58A; Lucretius 5,467–70; Cleanthes ap. Ciceronem, *De natura deorum* 1.37; 2.29–30.
92. Simplicius, *In Cat.* 361,12–26.

93. Iamblichus *ap.* Simplicium, *In Phys.* 639,23–32.
94. Plotinus 6.1–3.
95. P. Hadot, 'L'harmonie des philosophies de Plotin et d'Aristote selon Porphyre dans le commentaire de Dexippe sur les Catégories', in *Plotino e il neoplatonismo in Oriente e in Occidente*, Rome 1974,31–47.
96. Plotinus 4.3.20(50); 5.5.9 (4–5 and 31–2). I owe the references to S. Sakonji. Cf. Plato, *Timaeus* 36E.
97. Simplicius, *In Cat.* 362,7–16; 362,33–364,6.
98. Note the "so that" (*hōste*) in Simplicius' report at *In Cat.* 362,10.
99. Simplicius, *In Phys.* 640,10.
100. Simplicius, *In Phys.* 629,8–12; 637,25–30.
101. Syrianus *ap.* Simplicium, *In Phys.* 618,25–619,2.
102. Proclus *ap.* Simplicium, *In Phys.* 613,7–10 and 28.
103. Simplicius, *In Phys.* 625,28.
104. Simplicius, *In Phys.* 625,15–16; 626,8–12; 627,29; 628,1–2; 629,13–18; 645,12–13.
105. Damascius *ap.* Simplicium, *In Phys.* 625,14–17.
106. Extracted from Simplicius, *In Phys.* 626,8–27.
107. Simplicius, *In Phys.* 625,29; 626,7–9; 13–16; 644,33–4.
108. Simplicius, *In Phys.* 627,6–9; 12–14.
109. Simplicius, *In Phys.* 627,8–11.
110. Simplicius, *In Phys.* 625,28; 627,2; 14–15; 644,14; 23–4; 645,4.
111. Simplicius, *In Phys.* 640,20–641,7; 773,19–774,23.
112. Simplicius, *In Phys.* 644,24–5; 26; 645,6–17.
113. Damascius *ap.* Simplicium, *In Phys.* 645,7–10. For Proclus, see 613,9; and for Simplicius' endorsement see 643,12–13 and 773,25.
114. Simplicius, *In Phys.* 633,11–18.
115. Simplicius, *In Phys.* 626,5; 9; 18; 627,29; 644,11; 645,5; 13–14. Similar expressions at 626,3–4; 20; 26; 34; 644,14; 36.
116. Simplicius, *In Phys.* 634,11–31; 636,7–8; 636,27–637,18.
117. Simplicius, *In Phys.* 601,16–19, reporting Damascius' work *On Number, Place and Time*. Elsewhere in his *Problems and Solutions on First Principles*, Damascius gives something extended as an example of place in the primary sense (*kuriōs*, 2, 219,18–220,1), namely the sun's being in its extended (*diastatos*) light. This reference to solar light is not, I think, an endorsement of Proclus' view that place is a *supra-celestial* light (S. Sambursky, *The Concept of Place in Late Neoplatonism* 22; 68; 94).
118. Simplicius, *In Phys.* 626,3; 627,14; 630,12; 631,38; 634,2–24; 635,14–27; 638,6–17; 644,14–645,17; 774,6.
119. Simplicius, *In Phys.* 623,20; 634,21; 30; 636,7–8; 637,8–10; 15–17.
120. Simplicius, *In Phys.* 625,14–18.
121. Simplicius, *In Phys.* 627,16–17.
122. Simplicius, *In Phys.* 629,8–12; 637,25–30. The peculiar place which moves with a thing cannot be merely its volume (S. Sambursky, *The Concept of Place in Late Neoplatonism* 18; 22; 167), for mere volume has no active arranging power.
123. Simplicius, *In Cat.* 364,26–9; *In Phys.* 627,31–2. An example of parts of the earth would be North and South, *In Phys.* 626,24.
124. Simplicius, *In Phys.* 629,8–12; 637,25–30.
125. Simplicius, *In Phys.* 632,9–26.
126. Simplicius, *In Phys.* 631,38; 636,8–13; 637,8; 638,2.

127. References above, note 115.
128. Simplicius, *In Cat.* 364,11–18; *In Phys.* 626,13–16.
129. Simplicius, *In Cat.* 364,23–6; *In Phys.* 625,15–16; 626,8–12; 627,29; 628,1–2; 629,13–18.
130. Simplicius, *In Cat.* 364,31–5.
131. Simplicius, *In Phys.* 631,7–31. Elsewhere he suggests the alternative that the cosmos has matter as its place, *In Phys.* 467,37. Pseudo-Archytas' variant is that the place of the cosmos is the boundary (*peras*) of all things, *ap.* Simplicium, *In Cat.* 363,26–7. For the view that the whole can be said to be in the parts because it is inseparable from them, see above in note 35 references to Eudemus, Themistius, Simplicius, Philoponus.
132. Simplicius, *In Phys.* 633,18–634,3.
133. Simplicius, *In Phys.* 623,19–20. Iamblichus had said in another context that place has *ousia* (*ap.* Simplicium, *In Cat.* 361,7–30).
134. Simplicius, *In Phys.* 629,13–19; 630,30.
135. Simplicius, *In Phys.* 639,18–19.
136. Simplicius, *In Phys.* 630,21–631,6.
137. Simplicius, *In Phys.* 638,26–7.
138. Simplicius, *In Phys.* 630,24–30.
139. Philoponus, *In Phys.* 632,4–634,2.
140. Philoponus, *In Phys.* 579,27–580,3; 581,18–31.
141. For a different assessment of Philoponus' position as *ad hoc*, see Michael Wolff, "Philoponus and the Rise of Preclassical Dynamics," in Richard Sorabji, ed., *Philoponus and the Rejection of Aristotelian Science*, London and Ithaca, N.Y. 1986, 96.
142. Philoponus actually uses the phrase *drastērios dunamis*, power that acts, which Iamblichus had applied to place, but he reserves it for such things as the impetus of impetus theory (Philoponus, *In Phys.* 385,7). In discussing the "much talked of force (*poluthrulētos bia*) of vacuum," Philoponus still grants no power to place, on the analysis of David Sedley, "Philoponus' conceptions of vacuum," in Richard Sorabji, ed., (1986).
143. Philoponus, *In Phys.* 632,4–634,2.
144. Philoponus, *In Phys.* 581,18–31.
145. Strato, fragments 50–52 Wehrli = Simplicius, *In Cael.* 267,29; 269,4; Stobaeus, *Eclogae* 1.14.1 (Diels, *Dox. Gr.* p. 311).
146. See his *Letter to Herodotus* §60 (which is controversial), Lucretius 1. 1070, and the report of Simplicius, *In Cael.* 267,30; 269,4.
147. See Leukippos A24; Demokritos A60; A61 Diels-Kranz.
148. Contrast F.H. Sandbach *op. cit.*, p.44.
149. Diogenes Laertius, *Lives* 7.55; Sextus, *M* 8.263; Seneca, *Ep. ad Lucilium* 106,2ff; Cicero, *Acad. post.* 1.39; Nemesis, *Nat. hom.* p.32 (Matth.); Tertullian, *De anima* Ch.5; Aëtius, *Placita* 4.20.2 (= SVF 2.387).
150. Plutarch, *Com. not.* 1073E.
151. Plutarch, *Adv. Col.* 1116B–C; Sextus, *M* 10, 218; cf. *M* 10,3; *PH* 3,124. This point remains true, regardless of whether Plutarch is right (and Plutarch is challenged by David Hahn, *The Origins of Stoic Cosmology* 260–5) that Chrysippus wavered on a related issue. According to Plutarch, *St. rep.* 1054B–1055C, Chrysippus often denied, but once asserted, that bodies tend to the center of *space*, as well as to the center of the cosmos.
152. Because of a holding power which holds the cosmos together (*hexis sunekhousa*):

Cleomedes, *Kuklikē theoria* or *De motu circulari corporum caelestium* Book 1, Ch.1, p.10, line 24–12.5, Ziegler; Themistius, *In Phys.* 130,15–17; Alexander *ap.* Simplicium, *In Phys.* 671,8–12. Because of *pneuma*: Alexander, *Mixt.* 216,14–17; *ap.* Simplicium, *In Cael.* 286,15–21. *Pneuma* in one of its forms is the holding power: pseudo-Galen, *Introductio s. medicus* Kühn, vol.14, p.697; cf Plutarch, *St. rep.* 1053F; Diogenes Laertius, *Lives* 7.138; Themistius, *In DA* 35,32–4; Galen, *Comm. 5 in Hippocr. Epid.* 6, Kühn 17B,250; Galen, *Peri psuchēs ēthōn* Kühn 4.783; Galen *Defin. medicae* 95, Kühn 19,371. It holds things together by centripetal motions within it: Nemesius, *Nat. hom.*, Ch.2, p.42 Matth.

153. Cicero, *De natura deorum* 2.29–30.
154. Plutarch, *St. rep.* 1054E–F; 1055B–C.
155. Plato, *Timaeus* 52E–53A.
156. Plato, *Timaeus* 50B, discussed in the commentary of Calcidius §§301; 329; 352.
157. See Simplicius, *In Phys.* 539,8–542,14 (quoting Alexander); Philoponus, *In Phys.* 516,5–16; 521,22–5.
158. Syrianus, as interpreted by Simplicius, *In Phys.* 618,25–619,2.
159. Simplicius, *In Phys.* 613,28.
160. William H. Donahue, *The Dissolution of the Celestial Spheres*, Ph.D., Diss., Cambridge 1973, 14–15 (and Arno Press N.Y., 1981): there is a decreasing tendency of earth, water and air to cling to each other. They also have a natural circular motion around the sun.
161. Descartes, *Principles of Philosophy* 4.26.
162. S. Sambursky (1982), 22; Bertrand Russell, *The ABC of Relativity*, London 1925 (3rd edition 1969).
163. I am grateful to Arthur Fine for information on this subject.
164. I am indebted for discussion to Peter Alexander, Victor Caston, Arthur Fine, Eric Lewis, Christopher Rowe, S. Sakonji, and especially to David Sedley for his formal reply to me, and to Myles Burnyeat for pressing on me his interpretation of Aristotle. The foregoing topics will be discussed in a wider context in my *Matter, Space and Motion*, in preparation.

The Relationship between Theophrastus' *Metaphysics* and Aristotle's *Metaphysics* Lambda¹

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The theme of the brief work entitled *Metaphysics*, traditionally attributed to Theophrastus, is announced in the opening lines as the investigation of "first things."² The contrast drawn between "first things" and "things of nature" harks back to the Platonic distinction between forms and particulars. The "things of nature" are perceptible, and the natural realm is characterized by mutability and a relative lack of order. The "first things," on the other hand, are ordered and immutable, and they are grasped by the intellect, not by sense perception.³ Theophrastus regularly uses the Platonic terms "intelligibles" (*noēta*) and "sensibles" (*aisthēta*) to designate the two types of entities.⁴

Theophrastus' discussion touches on a variety of questions, and the connecting links are not always evident. But it is fair to say that all the questions are related directly or indirectly to two main topics: the nature of the so-called first things and their relationship to the natural world, the world of changeable and perceptible entities. The style of the discussion is, for the most part, aporetic. Various views are introduced and elaborated, and then subjected to a series of difficulties and objections. Theophrastus does not offer answers of his own to the questions discussed; however, he makes it clear that he thinks some views are much more plausible than others, even though they too are open to serious objections.⁵

The aporetic nature of Theophrastus' discussion has led some commentators to compare his work with Aristotle's discussion of *aporiae* in *Metaphysics* B (*Metaph.* B).⁶ But there are several noteworthy differences. First, the dilemmas that Aristotle sets out are often the result of pitting his own views against those of the Platonists and showing that each side can apparently be criticized from the standpoint of the other.⁷ Sometimes the difficulties relate exclusively

to his own theories. The views Theophrastus focuses on, however, are never his own; they are either attributed to some member of the Academy, or they are clearly identifiable as Aristotelian doctrines. In this respect, his discussion is more like Aristotle's critical treatment of the views of his predecessors in *Metaph. A*.

A second difference between Theophrastus' treatise and both *Metaph. A* and *B* can be seen in the fact that, although his discussion is clearly intended as a preparation for a more positive treatment, it is not presented—as *A* and *B* are—as part of a projected longer work.⁸ Theophrastus does not imply that *he* will attempt to solve the various difficulties canvassed in the course of his discussion. It would thus be wrong to describe his *Metaphysics* as a fragment.⁹ It is a self-contained, complete work.

An interesting and little-noticed feature of Theophrastus' treatise is the selective nature of its discussion of Aristotelian views. In the case of the Academy, the references to specific doctrines are rather sketchy but comprehensive: we find allusions to important metaphysical views of not only Plato but of Speusippus and Xenocrates as well.¹⁰ By contrast, all of the Aristotelian doctrines discussed come from a single book of the *Metaphysics*: Book Lambda. Though the subject matter is metaphysics, there is no trace in Theophrastus of the familiar expression, "the science of being *qua* being," nor of the contrasts between this science and physics and mathematics which are elaborated in the central books of the *Metaphysics*. In assessing Aristotle's metaphysical theories, Theophrastus relies on Book Lambda as his sole and exclusive source.¹¹

This exclusive concentration on Book Lambda is surprising and puzzling for several reasons. One of the most characteristic features of Aristotle's metaphysics is the way in which the highest science—that which investigates the highest kind of entities—is at the same time conceived as a universal science of being. This feature is elaborated in a number of well known passages in the central books, but it is not mentioned in Lambda. If Theophrastus had all of the books of the *Metaphysics* before him, one wonders why he makes no allusion to this central doctrine. Again, he speaks at one point of those who divide things "into matter and form," but his account of the distinction is quite rudimentary;¹² why is there no mention of the rich and complex views developed in *Metaph. Z* and *H*? Another sort of puzzle arises for those who accept Jaeger's view that *Metaph. Lambda* is an early work that was later superseded, or at least supplemented, by the central books.¹³ If Aristotle came to regard Lambda as incomplete or defective in its account of the relationship between metaphysics and the other sciences, why would Theophrastus limit his attention to this book and ignore the more authoritative central books?

Recently it has been argued that Theophrastus' treatment of Lambda as the

authoritative text for Aristotle's metaphysical doctrines gives us good reason to regard it as a relatively late work—perhaps one of the latest of the books making up the *Metaphysics*.¹⁴ But even if we accept that Lambda is late, we are still left with a serious difficulty. No one has suggested that Lambda was intended to *replace* the central books as the sole authoritative source for Aristotle's metaphysical doctrines. Those who believe that Lambda is late have tried to show that its doctrines are compatible with those of the central books, and that together with them it was intended to form part of a (roughly) unified treatise. But if this view is correct, we may wonder once again why Theophrastus restricts his attention to Lambda and does not consider doctrines of the central books that are clearly relevant to his main theme.

Theophrastus' concentration on *Metaph. Lambda* is a stumbling block not only for Jaeger's view that Lambda is an early work superseded by the later central books of the *Metaphysics*, but also for the more traditional view that Lambda forms a doctrinal unity with the central books and expresses the mature, final stage of Aristotle's metaphysical theorizing. My aim in the following remarks is to show that Theophrastus' brief work is a piece of the puzzle over the relationship between Book Lambda and the rest of the *Metaphysics*, and that it deserves more attention than it has received in the past. I will first offer a critique of one recent attempt to use the Theophrastean piece to solve the puzzle, and then put forward an alternative hypothesis of my own. My goal, however, is not to give a comprehensive and definitive account of the relationship between Lambda and the rest of the *Metaphysics*, but rather to convince the reader that Theophrastus' *Metaphysics* must play a role in such an account.

I

The work of Giovanni Reale has the merit of drawing our attention to the relevance of Theophrastus' treatise to the vexing questions concerning the unity of Aristotle's *Metaphysics*.¹⁵ He notes the close connection between the Theophrastean treatise and *Metaph. Lambda* and points out that this poses a serious difficulty for Jaeger's view that Lambda is a relatively early work that was later superseded by the central books of the *Metaphysics*. If Lambda was indeed superseded by the central books, it is difficult to see why Theophrastus should make it his chief source for Aristotle's metaphysical theories. Reale suggests that it makes better sense to regard Lambda as one of the latest of the books making up the *Metaphysics*.

Before taking a closer look at Reale's arguments, it will be helpful to begin with a sketch of Jaeger's reasons for assigning Lambda to an early stage in Aristotle's metaphysical thought. Paramount for Jaeger was the conception of metaphysics or "first philosophy" outlined in the first chapter of Lambda.¹⁶

Aristotle there divides substances into three kinds: first, there are two types of perceptible substance, the perishable and the eternal (the heavenly bodies), and then there is a third kind of substance that is eternal, immutable, and not perceptible.¹⁷ Since the first two kinds of substance partake of motion, they are both assigned to the science of physics; the third kind is the object of a separate science that is unnamed here but is elsewhere designated “first philosophy,” or sometimes simply “philosophy.”¹⁸ Later in Lambda it becomes clear that the third kind of substance constitutes the sphere of the divine; i.e. the unmoved movers—especially the mover of the sphere of fixed stars, the first principle of motion in the cosmos. Hence the study of the third kind of substance is in effect theology. Jaeger concludes that Lambda conceives of first philosophy or metaphysics as restricted in its scope to a particular kind of substance.¹⁹

It is well known that in the central books Aristotle offers a different description of the science he is seeking. In a number of passages he stresses its universality and inclusiveness, characterizing it as the “science of being *qua* being.” He contrasts it with sciences like physics that have as their subject matter only a *part* of being.²⁰ In these passages, metaphysics or the highest science seems to be regarded as general ontology.

Jaeger holds that these two characterizations of metaphysics are not only different but incompatible.²¹ The first characterization, metaphysics as the science of suprasensible substance (i.e. theology), is closely related to Platonic doctrines, and he therefore suggests that this expresses Aristotle’s earlier view. We’ll see that this is not quite true of Plato—at least as Aristotle understood his view. This view is later superseded by the broader conception of metaphysics as general ontology, which we find in the central books of the *Metaphysics*.

Unfortunately this neat and tidy picture needs to be qualified in an important way. Jaeger feels compelled, on the basis of stylistic and historical considerations, to treat chapter 8 as a later insertion into the main body of Lambda.²² It may be recalled that in this chapter, Aristotle appeals to recent astronomical theories to determine the number of unmoved movers needed to account for the movements of the stars and planets. The date at which the astronomical theories were developed (by Callippus) precludes an early dating for chapter 8; according to Jaeger, the chapter must have been written toward the end of Aristotle’s life.²³

Reale focuses on Jaeger’s treatment of chapter 8 as a particularly vulnerable link in his overall argument. He points out that we find the same conception of first philosophy in chapter 8 as in the rest of Lambda.²⁴ The relevant passage reads as follows:

That the movers are substances, then, and that one of these is first and another second according to the same order as the movements of the stars, is evident. But

in the number of movements we reach a problem which must be treated from the standpoint of that one of the mathematical sciences which is most akin to philosophy—viz. of astronomy; for this science speculates about substance which is perceptible but eternal, but the other mathematical sciences, i.e. arithmetic and geometry, treat of no substance.²⁵

Astronomy is “most akin” to the highest science—“first philosophy,” or simply “philosophy”—insofar as it deals with perceptible substance that is eternal and that of course partakes of motion. The highest science, presumably, would deal with the highest kind of substance: that which is eternal, immovable, and not perceptible. This passage clearly seems to presuppose the same tripartite classification of substance that we find in chapter 1, and the highest kind of substance is assigned to the worthiest science, namely “philosophy” or “first philosophy.”

This conception of first philosophy as the science of the highest kind of substance was Jaeger's main reason for separating Lambda from the central books and treating it as earlier. If the same conception appears in chapter 8, which Jaeger thinks must be late for historical reasons, then it looks as if we no longer have a solid basis for regarding Lambda as early. It turns out that the supposedly early conception of metaphysics as theology is found in a passage which, by Jaeger's own account, must be one of the latest in the *Metaphysics*.

Reale is not much interested in the question whether Lambda was written before, or at the same time as, the central books of the *Metaphysics*. (He seems committed to regarding it as late since he believes the whole book, including chapter 8, was written as a unity, and seems to accept Jaeger's argument for a late dating of chapter 8.) His chief concern is to establish that the conception of first philosophy in Lambda is essentially the same as that which is found in the rest of the *Metaphysics*.

According to Reale, Aristotle's notion of first philosophy is complex, consisting of four main aspects or dimensions. We have already mentioned two of these aspects: (1) the study of the highest substance, or *theology*, and (2) the study of being in general, or *ontology*. But first philosophy may also be described as: (3) a study of the ultimate causes and principles of all things, and (4) an investigation of the category of substance in particular. Reale tries to show that these four aspects are interrelated so as to form a unified conception of first philosophy, and that each of the four can be found in all of the various parts of the *Metaphysics*.²⁶

Since the theological aspect is most conspicuous in Lambda, Reale devotes much of his discussion of this book to a demonstration that the other three aspects of first philosophy are also present. He argues that, even though Aristotle does not use the expression “being *qua* being,” he indicates in chapter 1 and elsewhere in Lambda that the general aim of the discussion is to discover the principles and causes of all beings.²⁷ First philosophy, then, is not only thought of as the study of the highest kind of substance; it is at the same

time a study of being taken quite universally, that is, ontology, and also a study of ultimate principles and causes. The fourth aspect, the study of substance in particular, is manifested in Aristotle's claim that because substance is prior to entities in the other categories, the principles of substance will be in a way the principles of all things; hence, the investigation can focus on the category of substance.²⁸

In sum, first philosophy is not limited to theology, or the study of suprasensible substance, in Lambda; it also has the same aspects or descriptions that are prominent in the central books, and these aspects combine to form a unity.

A third argument of Reale, as we mentioned earlier, appeals to Theophrastus' *Metaphysics*.²⁹ Theophrastus appears to treat Lambda as the authoritative source for Aristotle's views concerning the first principles of reality. This is difficult to square with Jaeger's claim that Lambda does not give us the final form of Aristotle's conception of first philosophy, that is that its view of first philosophy is superseded by the doctrines set forth in the central books of the *Metaphysics*. If Jaeger is right, why would Theophrastus focus his attention on a work that does not reflect Aristotle's mature, considered view of the nature and scope of first philosophy?

II

Let us now take a closer look at these arguments. Since my general aim is to investigate the relationship between Theophrastus' treatise and Aristotle's *Metaphysics*, my examination of Reale's first two arguments will be limited to matters that have a bearing on that relationship.

Let us begin with the problematic relationship between chapter 8 and the rest of Book Lambda. Jaeger cited several reasons for his view that this chapter does not fit into its context.³⁰ In chapters 6–7 and 9–10, Aristotle speaks as if there is only one unmoved mover, whereas in chapter 8 he argues that there must be more than one: the number of unmoved movers must be the same as the number of spheres required to explain the movements of the stars and planets. Secondly, there are striking stylistic differences between chapter 8 and the surrounding chapters; moreover, the chapter interrupts the flow of the discussion from chapter 7 to chapter 9. If Jaeger is right about these matters, his claim that chapter 8 is a misfit in its surrounding context would certainly be reasonable, but we would not yet have any clear reason for regarding it as a *later* insertion, written during the last years of Aristotle's life. This claim is based on the fact that in chapter 8, Aristotle discusses certain modifications of Eudoxus' astronomical theory introduced by his pupil Callippus. Given the dates of Callippus' life and of his sojourns in Athens, Jaeger argues that

Aristotle could not have learned of these innovations before 330 B.C., that is, before his final years in Athens.

Each of these points has been contested by various scholars. For example, it has been noted that in chapter 6 Aristotle also speaks of a plurality of unmoved movers, so there does not seem to be a clearcut difference of cosmological doctrine between chapter 8 and the rest of *Lambda*.³¹ Again, Ingemar Düring and others have argued that there is historical evidence suggesting that Callippus' innovations may have been developed a number of years before 330, and that Aristotle could have learned of them well before his final years in Athens.³² In any case, the evidence cited by Jaeger seems tenuous and leaves plenty of room for doubt.³³ Whether or not chapter 8 is representative of the final stage of Aristotle's thought should be decided on other grounds.

As we noticed earlier, Reale draws our attention to a passage in chapter 8 that is of great importance in evaluating Jaeger's theory. The passage envisions a hierarchy of sciences with "philosophy" or first philosophy occupying the highest position. Astronomy is said to be "most akin" to philosophy insofar as it investigates substance that is eternal and partakes of motion. The hierarchical ordering of sciences, in other words, depends on a corresponding order of their subject matters. Other mathematical sciences, such as geometry and arithmetic, rank below astronomy because their subject matter is not even a kind of substance, let alone eternal substance. The highest sciences deal with substances, and since there is an order among these sciences there must be a corresponding order among the substances they investigate. The different kinds of substances seem to correspond to those distinguished in chapter 1: at the bottom of the scale is substance that is perishable, movable, and perceptible; next is substance that is eternal, movable, and perceptible, i.e. the heavenly bodies; and finally, at the top of the scale, is substance that is eternal, immovable, and suprasensible. In chapter 8 astronomy is ranked just below "philosophy," and is said to investigate substance that is eternal, movable, and perceptible. Philosophy, then, must investigate the highest kind of substance, or that which is eternal, immovable, and suprasensible. In other words, chapter 8 implicitly contains the same tripartite classification of substances found in chapter 1, and conceives of first philosophy as dealing with a particular kind of substance—the suprasensible, divine, unmoved movers.

According to Jaeger, this conception of first philosophy is characteristic of the early, Platonic phase of Aristotle's development, and stands in contrast with the later conception of metaphysics as a general science of being *qua* being.³⁴ If we accept Jaeger's view that there was an evolution from a science of suprasensible substance to a science of being in general, we have strong reason to assign chapter 8 to the early phase. If Düring is right, and the reference to Callippus does not compel us to assign a late date to chapter 8,

then we should treat it as more or less contemporary with the rest of Lambda. Assuming that Jaeger's general evolutionary thesis is correct, this would mean that Lambda in its entirety should be assigned to the early phase of Aristotle's metaphysical thought.

Reale, on the other hand, argues that first philosophy is not limited to the study of suprasensible substance in Lambda; he tries to show that general ontology, the study of substance in particular, and the study of the ultimate principles and causes are all inherent in the conception of first philosophy, no less in Lambda than in the central books. If we are persuaded by his arguments for these claims, then we will naturally regard Lambda in its entirety as representative of the mature, final stage of Aristotle's metaphysics.³⁵

Thus our discussion of the relationship between chapter 8 and the rest of Lambda does not show that Reale's unitarian view is mistaken; what it shows is that chapter 8 cannot be used as evidence for that view. Even if we agree with Reale that the philosophical content of chapter 8 is in perfect harmony with the rest of Lambda, we will have to rely on other considerations to determine the exact relationship between Lambda and the central books since the historical evidence for the lateness of chapter 8 is of dubious value.

III

Let us turn, then, to Reale's second argument: his contention that first philosophy in Lambda is not restricted to theology but includes the three other aspects that are emphasized in other books of the *Metaphysics*. As Reale points out,³⁶ the first sentence of Lambda states that substance is the subject of the whole inquiry. On the assumption that the inquiry (*theōria*) in Lambda falls within the scope of first philosophy, it seems clear that first philosophy cannot be limited to theology or the study of suprasensible substance; it must somehow at the same time be a study of substance in general. Aristotle also says, in chapters 1, 4, and 5, that since substance is ontologically prior to the other categories, the principles of substance are in a way the principles of other kinds of entities as well. Reale suggests that the subject of the investigation may therefore be characterized as the ultimate principles and causes of all things. Thus there is evidence in Lambda that Aristotle conceives of his investigation as something broader and more complex than a simple study of suprasensible substance: it is at the same time a study of substance, a study of ultimate principles and causes, and a study of being in general, that is, a general ontology.

A full examination of Reale's claims would require looking not only at Lambda in order to see, for example, whether general ontology is indeed an aspect or part of Aristotle's notion of first philosophy, but also looking at other books of the *Metaphysics*, especially the central books, to see if theology

has the same role or status in the concept of first philosophy there that it has in Lambda. However, for the specific purpose of clarifying the relationship between Theophrastus' *Metaphysics* and Aristotle's work, we may restrict our attention to the question whether general ontology—an investigation of being *qua* being of the sort described in the central books—forms a part of Aristotle's concept of first philosophy in Lambda.

In this connection, it is important to draw a distinction between two concerns: how Aristotle describes the subject or subjects of his discussion in Lambda, and how he describes the subject matter of first philosophy. Of course, if Lambda is devoted exclusively to first philosophy, these two descriptions must come down to the same thing. But Aristotle does not say explicitly that all of the various topics discussed in Lambda come under the heading of first philosophy, and we should not automatically assume that they do. In fact, according to a natural way of understanding the distinction between first philosophy and physics in chapter 1, it seems obvious that part of the discussion of substance in Lambda does *not* fall within the scope of first philosophy. Physics is said to be the investigation of perceptible and movable substance, while first philosophy is the study of substance that is neither perceptible nor movable. We may also note that Aristotle states explicitly that the theme of his discussion in chapters 2–3 is perceptible substance, and it has been pointed out that these chapters are closely tied to the final chapters of *Physics* Book 1.³⁷ Thus these chapters, at least, seem to fall outside the scope of first philosophy, and if so, it would be a mistake to equate the subject matter of Lambda with that of first philosophy.

This line of argument, however, is based on the questionable assumption that there is no overlap between the subject matters of physics and first philosophy. Aristotle points out elsewhere that an investigation of immovable and nonperceptible substance should begin with that which is more familiar to us, namely perceptible and movable substance.³⁸ It would be plausible to suppose, as Reale does, that the discussion of perceptible substance in Lambda 2–5 has the same function, serving as a propaedeutic to the study of suprasensible substance. But does it follow from this that Aristotle thought of this preliminary investigation as a *part* of first philosophy? Jaeger also believed that the discussion of perceptible substance was meant to serve as a stepping-stone to the study of suprasensible substance, but he argued that first philosophy was confined to the latter investigation, which begins in chapter 6 and continues to the end of the book.³⁹

There is another reason, however, why a discussion of perceptible substance must be an integral part of first philosophy. One of the most important characteristics of suprasensible substance for Aristotle is its function as primary cause of motion in the cosmos. To understand the causal nature of this kind of substance, we must have some grasp of what it is related to as a

cause, that is, of those entities whose motion depends on it.⁴⁰ Some discussion of sensible substance *qua* movable, and of the way in which its motion is caused, seems indispensable to an understanding of suprasensible substance. Hence there must be some overlap between the subject matters of physics and first philosophy: first philosophy must include some account of movable (and sensible) substance and of the way in which its motion is caused. It seems reasonable to conclude that the entire discussion of substance in Lambda falls within the scope of first philosophy.

We should note that, for analogous reasons, the subject matter of physics cannot be restricted to sensible substance. If physics investigates the causes and principles of sensible, movable substance, and one of those causes or principles is suprasensible substance, then physics must concern itself with this latter kind of substance, at least insofar as it is a cause of motion.⁴¹

The partial convergence of the subject matter of physics and first philosophy raises a question about their status as separate and distinct sciences. If the unmoved mover is a first principle both in physics and in first philosophy, then there is at least one principle that they have in common. But the following passage in Lambda 1 seems to say that they cannot in this case be separate sciences.

The former two kinds of substances [perceptible-perishable and perceptible-imperishable] are the subject of physics for they both partake of motion; but the third kind belongs to another science, *if there is no principle common to it and the other kinds*.⁴²

All commentators agree that Aristotle is not here calling into question the existence of a distinct science (first philosophy) corresponding to the third kind of substance. It is natural to read the clause at the end of the sentence as implying that there are distinct sets of principles for sensible and suprasensible substances respectively, and hence a basis for two distinct sciences. But Aristotle clearly regards the unmoved mover as a first principle of motion and change in the sphere of sensible substances; is there not at least one principle, then, that applies to both sensible and suprasensible substance?

The solution to this difficulty lies in the fact that, for Aristotle, there are no principles of suprasensible substances. All suprasensible substances are principles of motion, but there are no prior principles accounting for their motion since they have no motion. Furthermore, we cannot explain what suprasensible substances are by analyzing them into prior elements or principles, for there are no elements or principles prior to them. We grasp them as principles of other things.

So even though there are not two different sets of principles for sensible and suprasensible substances, there can still be distinct sciences of the two kinds of

substances since there are no principles which they have in common. The principle which they seem to have in common is actually not a principle of suprasensible substance.

In several places in the *Metaphysics*, Aristotle indicates how Plato's theory differs from his own in this respect. Plato's ultimate causes are principles both of suprasensible substance (i.e. forms and mathematical objects) and of things in the sensible world; they are "principles of all things."⁴³ Since sensible and suprasensible entities have at least some of their principles in common, there cannot be distinct sciences of the two kinds, at least according to the rule given in the passage quoted above. In fact, Aristotle tells us that Plato thought there was a single science of the elements and principles of all things; the goal of this science is to discover and explicate these elements and principles.

Aristotle says (in A 9) that it is a delusion to think that there could be such a science. There cannot be some common set of elements shared by all of the different categories of entities; if there are fundamental elements, they would be elements of substances alone. We find the same view, spelled out in more detail, in chapter 4 of Lambda. Aristotle has just completed his sketch of the fundamental elements or principles of substance.⁴⁴ He now raises the question whether these elements might also be the elements of entities in other categories besides substance. This cannot be the case for, first of all, substances are not elements of nonsubstances, nor are nonsubstances elements of substance.⁴⁵ Second, there is nothing that is both common and prior to substance and the other categories, as elements or principles would need to be. The only way in which it would be legitimate to speak of all things having the same principles or elements would be by invoking "sameness by analogy."⁴⁶ In other words, if A, B, and C are the elements of substance, there might be analogous principles D, E, and F in the case of relations or qualities, and so forth.

Thus Aristotle rejects the idea that there might be a general science of being in A 9, and he provides a defense of this position in Lambda 4.⁴⁷ In the light of these passages, it is hard to see how he could have regarded the study of suprasensible substance as constituting at the same time a general science of being. We have seen that first philosophy must include some discussion of sensible substance: its subject matter cannot be restricted, as Jaeger thought, to suprasensible substance. (In a similar way, the subject matter of physics cannot be restricted to sensible substance.) On the other hand, there seems to be strong textual evidence that Aristotle does not conceive of first philosophy in Lambda as a general science of being, or a general ontology.

IV

It might be argued that I have not given enough weight to Aristotle's claim that the principles of substances and nonsubstances are the same by analogy. I

have interpreted the claim negatively, as saying in effect that since the principles of entities in different categories are not the same, except by analogy, there cannot be a single science of the principles of all things. But one could interpret it positively, that is as the claim that since the principles of all things are the same by analogy, there *can* be a general science of being. According to this way of understanding Aristotle's position, Plato's error was not his belief that there could be a science of the principles of all things, but his failure to understand the basis of such a science. First of all, he failed to appreciate the differences between substance and the other categories of being, and the fact that there could not be a set of identical principles for all the entities in the different categories. And consequently he did not see that a general science of being must concern itself with principles that are the same by analogy.

This interpretation does not square, however, with Aristotle's argument in A 9: he not only attacks the Platonic basis of a universal science of being, but also the sheer possibility of such a science.⁴⁸ Furthermore, the idea that different subjects may be studied by a single science if their principles are the same by analogy does not accord with Aristotle's view of the unity of science in the *Posterior Analytics*. Two distinct and independent sciences, he points out, may have or employ the same principles, but in this case the principles will only be the same "by analogy."⁴⁹ In other words, having principles that are analogically the same is not enough for a unified science.

It is true, of course, that Aristotle argues in favor of a general science of being in the central books, especially in Gamma and E, but according to Jaeger's evolutionary interpretation, these books represent a later doctrine, and it would be begging the question to appeal to them in trying to determine Aristotle's view in Lambda. A comparison of Gamma with Lambda actually tends to favor the evolutionary interpretation. The argument for the possibility of a general science of being in Gamma is directed against an objection along the following lines. According to the *Posterior Analytics*, the subject matter of a science must constitute a unified genus. However, being "divides immediately" into genera,⁵⁰ and does not itself constitute a single genus. So there cannot be a single science of being as such.

To overcome this objection, Aristotle in Gamma introduces a new way of meeting the "unity of subject matter" requirement. If there is to be the kind of unity required for a science, either its objects must constitute a single genus, or they must exemplify what has come to be called the "focal meaning" relation. Aristotle illustrates this relation in the following way.⁵¹ The things that are called "healthy" do not constitute a single genus, for the definitions of "healthy" as applied to organisms, foods, or complexions are different in each case. An organism is healthy, let us say, if its humors are properly balanced, whereas food is healthy if it is productive of this condition in an organism, and

a complexion is healthy if it is indicative of this condition. Nevertheless the different significations of "healthy" all have a certain unity in that there is one that is central and primary, and the others all refer back to it: the account of "healthy" as applied to organisms is referred to in the definitions of the other significations, but not vice versa. The central, primary signification of "healthy" is thus *logically* prior to the others. So although "the healthy" does not have generic unity (the unity of a genus), it has what we might call "focal unity." And Aristotle says that this second kind of unity is enough to make possible a single science of "the healthy."⁵²

These points are then applied to the case of being. Although it is true that "being" does not have generic unity, its different significations—substance, quality, quantity, etc.—exemplify the same relation as the different significations of "healthy." The signification of "being" as applied to substances is central and primary, since all the other significations include reference to it, but not vice versa. Hence a single science of being is possible, even though being lacks generic unity.

Turning to Lambda, the contrasts with Gamma are striking. There is no trace of the interesting account of the "focal unity" of being, and no mention of the possibility of a single science of being. Aristotle's few comments about the unity or lack of unity of being seem to point in the opposite direction: as we have seen, his rejection of a single set of identical elements or principles of all things is evidently related to his argument (in A 9) against the possibility of a single science of being.

The denial of the generic unity of being is common to Gamma and Lambda.⁵³ Each book proposes a second-best kind of unity, but they are quite different. Instead of the focal unity of Gamma, in Lambda we find what might be called "analogical unity": as substance is to quantity, so are the elements of substance to the elements of quantity. This notion of analogical unity does not involve the logical priority of substance in the way that focal unity does.⁵⁴ Instead, what is stressed in Lambda is the *ontological* priority of substance.⁵⁵ In Gamma, on the other hand, the stress is on logical priority, and there is no mention of analogy.

According to the plausible suggestion of G.E.L. Owen, the focal unity doctrine in Gamma was designed to replace the earlier account of the relationship between substance and the other categories in terms of analogy. It is hard to deny that the one view is philosophically more complex and sophisticated than the other. It seems mysterious that Aristotle would make no allusion to the focal unity doctrine if he had developed it at the time of writing Lambda. But we need not insist on this point; what is important to note for our discussion is that the contrast with Gamma brings out all the more clearly the fact that there is no evidence in Lambda of the possibility of a general science of being.

V

We have agreed with Reale that Aristotle does not regard first philosophy in *Lambda* as restricted to the study of suprasensible substance; it must include some discussion of sensible substance in order to make clear how suprasensible substance is a cause of motion. In attempting to understand how Aristotle distinguishes between physics and first philosophy, we have noticed an important difference between his view and Plato's. According to the Platonic view, as Aristotle sees it, there are principles of suprasensible substance that are at the same time the principles of all things. Thus Plato held that the science of suprasensible substance was at the same time a general science of being. Aristotle rejects this view. He holds, first of all, that there are no principles or elements of suprasensible substances. Second, he maintains that the elements or principles of substances (i.e. sensible substances) are not identical with the elements or principles of other types of entities. And for this reason there cannot be a general science of being—at least of the sort that Plato envisioned. In the central books of the *Metaphysics*, Aristotle constructs his own account of a general science of being, but its foundations are quite different from Plato's. In *Lambda* there is no trace of these new foundations, nor of the newly reinstated general science of being. There is no clear evidence in *Lambda* that Aristotle regarded first philosophy as constituting a general ontology.

On the other hand, the discussion in *Lambda* clearly seems to go beyond the scope of first philosophy. The opening lines announce that the aim of the inquiry is to discover the "principles and causes" of substance in general. And the account of the principles of sensible substance (in chapters 2–5) surely goes beyond what is needed in order to understand how the unmoved movers cause motion in the sensible world. It is, in effect, a comprehensive sketch of the fundamental elements and principles of sensible substance. And since suprasensible substance is one of the principles of sensible substance, the discussion of this kind of substance (which is no more than a sketch) in the remainder of *Lambda* can easily be seen as a continuation of the account of the principles and elements of sensible substance. And since suprasensible substances are themselves principles, but have no principles prior to them, the only principles of substances in general are principles of sensible substances. So the entire discussion in *Lambda* amounts to an account of the principles and causes of substance as such. Further, insofar as substances are primary or "first" in relation to other types of entities, their principles will also be first or primary. Hence the discussion may be characterized as an investigation of those things that are first or primary in relation to all other things, even though the principles of substance are not the principles of all things.

As I have suggested earlier, it should not be assumed that the scope of the

inquiry in Lambda coincides with the scope of first philosophy. In other parts of the *Metaphysics*, Aristotle takes pains to locate the inquiry he is engaged in on his map of the sciences. In Lambda, however, he is remarkably reticent about how his discussion relates to particular sciences; he does not tell us whether the inquiry into the principles of substance belongs to physics, first philosophy, or to some other unnamed science. It seems pretty clear from the evidence we have considered that he does not think it falls exclusively within the scope of either physics or first philosophy. Perhaps Aristotle wished to present in Lambda a brief account of those principles and causes that he regarded as primary and prior to all others—a sort of philosophical manifesto in reply to the Platonic theory of the principles of all things. Such an account would require Aristotle to combine doctrines from his physics and first philosophy, and would therefore not be confined within the scope of any particular science. Later on, when he discovered the focal unity of being and the related *logical* priority of substance, he came to think that the inquiry into the principles of substance might qualify as a general science of being. But this was a later discovery, and there are no signs of such a “science of being *qua* being” in Lambda. This at least seems to me the most plausible way of fitting together the various bits of evidence that we find in Lambda.

VI

We must now turn to the problematic relationship between Lambda and Theophrastus' *Metaphysics*. As I noted earlier, Reale argues that Lambda cannot represent an early stage of Aristotle's metaphysical thought, given that Theophrastus treats Lambda as the authoritative source for Aristotle's views. If Aristotle in his later years no longer endorsed the conception of metaphysics in Lambda, why would Theophrastus pay any attention to it?

The connections between Lambda and Theophrastus' brief treatise are indeed striking. A number of questions he discusses arise immediately out of particular arguments in Lambda. For example, he devotes several pages to problems with the theory of the unmoved mover, and he seems to have his eye on the way the theory is presented in Lambda.⁵⁶ In another section he discusses questions about the doctrine that things can be analyzed into matter and form (cf. Lambda 2–3).⁵⁷ More importantly, perhaps, Theophrastus' conception of metaphysics, or the highest science, is very similar to the one outlined in Lambda 1. He distinguishes the study of the “first things” from physics in terms of subject matter.⁵⁸ Physics deals with those things that are perceptible and partake of motion; the highest science deals with objects that are neither perceptible nor movable. For him, as for Aristotle, astronomy occupies a position between the highest science and the branches of physics that are concerned with perishable things.⁵⁹

What is most remarkable, however, is the complete absence of any reference to ideas in the central books of Aristotle's *Metaphysics*. Theophrastus describes his subject as the investigation of first things or principles and how they are related to the natural world. But he offers no discussion of whether and how such an investigation is universal; there is no mention of a science of being *qua* being or of related ideas, nor is there any reference to focal meaning or to the centrality of substance. For Theophrastus, as for Aristotle in Lambda, it is unclear how mathematics is related to physics and first philosophy; he seems unaware of the carefully conceived classification of the three disciplines in the central books.

If Theophrastus' dependence on Lambda were balanced by an equal dependence on relevant doctrines of the central books, this would be strong evidence that he, at least, did not believe that Lambda was superseded by the central books. But his *exclusive* dependence on Lambda is too much of a good thing for the unitarian interpretation. Are we to suppose that the central books were written earlier than Lambda and were superseded by it? If not, how are we to explain the fact that Theophrastus pays no attention to the important doctrines of the central books?

The close connection between Lambda and Theophrastus' treatise seemed at first to pose a serious difficulty for Jaeger's evolutionary view of the *Metaphysics*. However, the *extent* of Theophrastus' dependence on Lambda constitutes an equally serious difficulty for the unitarian view. The connection with Theophrastus is of no value to the unitarian interpretation unless an explanation can be given of his neglect of the central books—an explanation which is of course compatible with the general unitarian position. It seems to me unlikely that such an explanation can be found.

Ironically, the prospects seem brighter for the evolutionary approach. It is generally accepted that Theophrastus' association with Aristotle spanned a period of about 20 years, perhaps even longer.⁶⁰ He was part of the nucleus of scientists and philosophers who gathered around Aristotle during the years following his departure from Athens and the Academy. Given the length of his period of association with Aristotle, it is unlikely that Theophrastus' literary activity was confined to the period after Aristotle's death. It is quite possible that his *Metaphysics* was written during his years with Aristotle. Yet commentators have automatically assumed that the treatise must have been written after Aristotle's death.⁶¹ In the light of our discussion, a different hypothesis suggests itself: that Theophrastus wrote his brief discussion during Aristotle's lifetime, after Aristotle had finished Lambda but before he had developed the rich and complex doctrines of the central books of the *Metaphysics*. This would of course give us a neat explanation of why he focuses on Lambda and pays no attention to the relevant sections of the central books.

We have already mentioned several features of Theophrastus' discussion

which might be seen as lending support to our hypothesis. To show how this is so, it will be helpful to look at one of those features in more detail. We noted earlier that Theophrastus makes no reference to the relation of focal meaning. I have argued elsewhere that the concept of focal meaning does not appear in the *Organon* or in other early works of Aristotle; he seems to have discovered the notion only after these works were written.⁶² There are passages in the *Metaphysics* that date from this earlier period. For instance, the classification of the kinds of unity in Book Delta seems to be one.

Again, some things are one in number, others in species, others in genus, others by analogy; in number those whose matter is one, in species those whose definition is one, in genus those which are in the same category, by analogy those which are related as a third thing to a fourth. The latter kinds of unity are always found when the former are; e.g. things that are one in number are also one in species, while things that are one in species are not all one in number; but things that are one in species are all one in genus, while things that are so in genus are not all one in species but are all one by analogy; while things that are one by analogy are not all one in genus.⁶³

According to this passage, the widest kind of unity is that "by analogy," and this is the only possible kind of unity for things in different categories. As we noted earlier, analogy is a logically different relation from focal meaning; it does not involve any logical priority between the *relata*, whereas focal meaning does. As Aristotle shows in Gamma 2, the focal meaning relation provides a kind of unity among the categories—a unity different from generic unity and unity by analogy. The passage quoted from Delta shows no awareness of this other important type of unity. Similarly, the only kind of unity across categories mentioned in Lambda is unity by analogy; in Gamma and Zeta, on the other hand, the emphasis is on the focal unity of the categories, and analogy drops out of the picture.

The following passage from Theophrastus provides an interesting parallel to the quotation from Delta.

The identical something by means of which we know is identical either in essence or in number or in species or in genus or by analogy, or by any other divisions [of "the same"] that there may be besides these; but analogical identity spans the widest interval. . . .⁶⁴

We find roughly the same types of unity (or identity) distinguished in both passages, with "analogy" as the relation between things that are the furthest apart. Since Theophrastus is here distinguishing kinds of unity within the context of a discussion of knowledge, this passage would seem to be an obvious place to mention the kind of unity involved in the focal meaning relation. A natural explanation of its absence here, as well as in the parallel

passage in *Metaphysics* Delta, is that the notion had not yet been discovered. In other words, these passages were written before Gamma 2 and the other passages in the central books where the focal meaning relation is exploited.⁶⁵

There are other considerations in favor of an early dating of Theophrastus' treatise, but also some problems for our hypothesis. If Theophrastus formulated his criticisms of key doctrines in Lambda as early as we have suggested, it is odd that Aristotle seems to take no account of them in his later works. For instance, one might have expected him either to acknowledge the force of Theophrastus' objections to his account of how the unmoved movers cause the movement of the celestial bodies, or to try to show why the objections fail.⁶⁶

Another problem relates to Theophrastus' discussion of the limits on teleological explanation in the last section of his treatise. He considers a number of specific biological examples where teleological explanations seem to fail.⁶⁷ Some of these examples are pretty clearly taken from passages in Aristotle's biological works. Our hypothesis thus faces the following dilemma: either we must suppose that the passages in question were written relatively early and were not revised in the light of Theophrastus' criticisms, or that they were written later and that Aristotle took no account of the criticisms.

So, although the hypothesis of a relatively early date for Theophrastus' treatise has much to be said for it, there are a few difficulties that need further investigation. Weighing the difficulties confronted by the various possible views, our hypothesis seems at least as plausible as the others.

Our aim all along, however, has not been to defend a particular view of the relationship between Theophrastus' treatise and Book Lambda, but to bring out the importance of this relationship for the debate between evolutionary and unitarian interpretations of Aristotle's *Metaphysics*. This brief and puzzling work poses difficulties for both the unitarian and evolutionary approaches. If, on the other hand, we can gain a clearer understanding of its relationship to Book Lambda, we will have solved an important piece of the larger puzzle of the relationship between Lambda and the central books of the *Metaphysics*.

NOTES

1. I take this opportunity to thank the organizers of the Theophrastus Conference, Robert Sharples and William Fortenbaugh; it was a most enjoyable occasion. I am also grateful for the sharp and helpful comments of my respondent, Carlo Natali, and for suggestions made later in discussion by James Lennox and Allan Gotthelf.
2. W.D. Ross and F.H. Fobes, *Theophrastus Metaphysics* (Oxford, 1929), 4a2–9.
3. 4a3–9; cf. 6b27–8, 11b17–20. The pair of terms “imperishable-perishable” are not used to mark the distinction between the study of “first things” and physics because Theophrastus accepts the Aristotelian view that an important part of physics deals with imperishable entities (the celestial bodies); cf. 9b24–10a9 with 9a11–15.

4. 4a6–9; cf. 6b7–9, 9a12–15, 9b1–4. The Platonic pair, *noeta–aistheta* are rarely found in the Aristotelian corpus, but do crop up regularly in the *Magna Moralia*: see, e.g., 1183a26–7, 1196b25–7, 1197a20–1.
5. For instance, he makes it clear that he thinks Aristotle's theory of the unmoved movers gives a more plausible explanation of change and motion in the sensible world than the Platonic theory of forms or mathematical objects (4a17–5a13). Although Theophrastus does not *offer* (and defend) answers of his own, he does occasionally suggest views that he thinks might be more plausible than those he criticizes; for example, he tentatively puts forward the idea that the motion of the heavenly bodies might be an essential attribute, and therefore in need of no external motive cause (10a7–19).
6. Ross-Fobes, Introduction, pp. x, xx.
7. See, e.g. 998b14–999a23, 1001a4–1001b25, 1003a5–17.
8. A few passages call for further inquiry of a given question, but not in a way that implies that a positive discussion will follow; see 7b5–8, 8a8–10, 11b24–12a2.
9. As Ross-Fobes point out (p.x).
10. Plato, Speusippus and Xenocrates are referred to by name at: 6b6, 7, 11; 11a23, 27. For numerous references to their doctrines, see the index in Ross-Fobes. Aristotle is never mentioned by name.
11. Theophrastus' exclusive dependence on Lambda seems to have gone unnoticed in earlier discussions.
12. 8a8–20.
13. Aristotle, *Fundamentals of the History of his Development*, 2nd ed. (Oxford, 1948), 219–27. Though Jaeger's view that Lambda reflects an early stage in Aristotle's metaphysical thought has been rejected by many commentators, it still has worthy defenders; see, e.g., Ingmar Düring, *Aristoteles* (Heidelberg, 1966), 189–94. A. Mansion agrees with Jaeger's view that Lambda is early, but argues that its conception of metaphysics is not incompatible with that of the central books; as regards the concept of first philosophy, the central books supplement rather than supersede Lambda ("La genèse de l'oeuvre d'Aristote d'après les travaux récents," *Revue Néoscholastique de Philosophie*, 29 [1927], 307–41; 423–66; esp. 327–41). For informative discussions of the controversies inspired by Jaeger's work, see G. Reale, *Il concetto di filosofia prima e l'unità della Metafisica di Aristotele* (Milan, 1961) (English trans. by John R. Catan, *The Concept of First Philosophy and the Unity of the Metaphysics of Aristotle* [Albany, 1980], 424–97); H. Wagner, "Zum Problem der aristotelischen Metaphysikbegriffs," *Philosophische Rundschau*, 7 (1959), 129–53.
14. Reale, *Teofrasto e la sua aporetica metafisica* (Brescia, 1964), 103–34; English trans. in *The Concept of First Philosophy* (cited above), 364–91.
15. See the works cited above, nn. 13, 14.
16. Aristotle, 219–27.
17. 1069a30–b2.
18. Cf. *De caelo* 277b10, *De motu animalium* 700b9, *Physics* 194b14, *Metaph.* 1073b4; for a careful discussion of Aristotle's use of these terms, see A. Mansion, "Philosophie première, philosophie seconde et métaphysique chez Aristote," *Revue philosophique de Louvain*, 56 (1958), 165–221.
19. Aristotle, 220–1.
20. Gamma 2–3, E 1.
21. Aristotle, 217–9.
22. Aristotle, 342–54.
23. Aristotle, 343.

24. *First Philosophy*, 297, 371–2.
25. 1073b1–8.
26. See esp. *First Philosophy*, Chapters 1 and 7.
27. See, e.g., 1069a18–21, 1070b36–1071a2.
28. 1069a19–21, 1070b36–1071a2, 1071b5; Reale, *First Philosophy*, 298–307. In addition to showing that Aristotle views first philosophy under these four aspects in Lambda, Reale must also show that the same four aspects are present in other parts of the *Metaphysics*, interrelated in the same way, forming a unified conception of first philosophy. This part of his argument is obviously beyond the scope of our discussion.
29. See esp. *First Philosophy*, 378–82.
30. See above, n.22.
31. This point was made in A. Mansion's 1927 article (see above, n.13), 332–4 (the relevant passage in Chapter 6 is 1071b20–1). The point is argued in greater detail by Philip Merlan, "Aristotle's Unmoved Movers," *Traditio*, 4 (1946), 1–30. Jaeger's view is defended in D. Frede's "Theophrasts Kritik am unbewegten Beweger des Aristoteles," *Phronesis*, (1971) 65–79, esp. 67–70. Frede's arguments are persuasive, but one key element is missing: she does not explain the reference to a plurality of suprasensible substances in chapter 6 (1071b20–1). Assuming that Aristotle's aim in this chapter is to argue for the existence of suprasensible substance, it is understandable that he would want to concentrate on the first of the unmoved movers—the cause of the motion of the outermost sphere of fixed stars. (I agree with Frede that Aristotle is not trying to establish the existence of a *kind* of substance, but rather of a particular entity; 1072a23–6 indicates that it is the particular unmoved mover of the *prōtos ouranos* whose existence is being argued for.)
32. *Aristoteles*, (Heidelberg, 1966) 191–2
33. In particular, Jaeger's argument (on p. 343) that Callippus must have been dead at the time chapter 8 was written, and that if so the chapter could not have been written until after 330 B.C. seems quite doubtful. As Jaeger concedes, Aristotle's use of the imperfect tense in describing Callippus' views does not necessarily imply that Callippus was dead at the time; also, since we can only speculate about when Callippus died, Jaeger's claim about the date of chapter 8 must also be speculative. Chapter 8 may well have been written after the main body of Lambda; the important point is that there is no clear evidence that it was written as late as Jaeger claimed.
34. We will see shortly that, according to Aristotle's understanding of the Platonic doctrine, Plato's highest science was a study of "the principles of all things"; in other words, it was not restricted to a study of suprasensible substance, but was in a way a general science of being. Aristotle's early view of the more limited scope of first philosophy is actually anti-Platonic in its orientation, and his later defense of a general science of being may be seen as a sort of rapprochement with the Platonic view. This story is well told by G.E.L. Owen, in "Logic and Metaphysics in Some Earlier Works of Aristotle," in *Aristotle and Plato in the Mid-Fourth Century*, ed. I. Düring and G.E.L. Owen (Göteborg, 1960), 163–90. If Jaeger is mistaken in his account of Aristotle's relationship to Plato, this would not of course vitiate his arguments concerning the relationship between Lambda and the central books.
35. Reale does allow for an early stage in Aristotle's metaphysics insofar as he regards *On Philosophy* as a treatise on first philosophy, written before the development of the theory of the unmoved mover; see *First Philosophy*, 314–5. Düring (*Aristoteles*,

186) defends Jaeger's view that the theory of the unmoved mover was expounded in *On Philosophy*.

36. *First Philosophy*, 296–302.
37. See Düring, *Aristoteles*, 190.
38. *Metaph.* 1029a33–b5, 1037a10–16; cf. Reale, *First Philosophy*, 300–2.
39. *Aristotle*, 220. Jaeger is not entirely consistent: on p.219 he speaks as if the entire discussion in Lambda pertains to metaphysics or first philosophy.
40. See Mansion "La genèse" (cited above, n.13), 327–8; also E. Berti, *L'unità del sapere* (Padova, 1965), 135–6, and C. Natali, *Cosmo e divinità* (L'Aquila, 1974), 34, 41.
41. Thus, it is only to be expected that Aristotle also argues for the existence of an unmoved mover in *Physics* 8.
42. 1069a36–b2.
43. 987b18–25 (cf. 985b23–26), 992b18–993a10, 1086a26–29.
44. In chapters 4 and 5 Aristotle speaks of the elements or causes of substance, not of sensible substance. This might seem strange in that he has not yet discussed all substances—he has not yet discussed suprasensible substance. However, since there are no elements or causes of suprasensible substance, his list of the principles and causes of sensible substances (including the first cause of motion: 1070b34–5, 1071a35–b2) is at the same time a list of the principles of substance in general.
45. 1070a33–b4. Aristotle states at 1070b13–14 that the elements of substances are themselves substances; cf. 1073a34–6. We seem to find a different view in Z: see 1041a3–5.
46. 1070b10–21.
47. See Owen, "Logic and Metaphysics," 179–81; Owen draws our attention to the explicit denial of a general science of being in the *Eudemian Ethics* 1.8 (1217b33–5).
48. 992b24–993a10.
49. See 76a37–40, 77a26–35, 88a31–b2.
50. 88b1–2, 92b14.
51. 1003a34–b6.
52. 1003b11–14; cf. 1005a2–11.
53. See Lambda 1070b1–3.
54. Cf. Owen, "Logic and Metaphysics," 180.
55. 1071a1–2, 34–5.
56. 4b18–6a14, 7b9–8a7.
57. 8a8–20.
58. 4a2–9.
59. 10a5–9; note also the reference to *ta en archē*, (among objects that partake of motion) at 9a13; cf. 11b17–20.
60. See Jaeger, *Aristotle*, 115–6; also P. Steinmetz, "Ansatzpunkte der Elementenlehre Theophrasts im Werk des Aristoteles," in *Naturphilosophie bei Aristoteles und Theophrast* (Heidelberg, 1969), 224.
61. In addition to Reale, cf. Jaeger, *Aristotle*, 349–50, and Ross-Fobes, xxv. An exception is Frede (see article cited above, n. 31). Frede argues that the Theophrastean treatise was written between the early period of the main body of Lambda and the later "correction" set forth in chapter 8. For doubts about the alleged doctrinal incompatibility between chapter 8 and the surrounding chapters, see above, n. 31. W. Theiler ("Die Entstehung der Metaphysik des Aristoteles, mit einem Anhang über Theophrasts Metaphysik," *Museum Helveticum*, 15 [1958] 102–5) argues that

since Theophrastus' criticisms take into account the multiple unmoved movers of Lambda 8, and since Lambda 8 is quite late, Theophrastus probably wrote his treatise after the death of Aristotle. We have noted above, however, that the arguments for a late dating of chapter 8 are highly questionable.

62. See "The Primacy of *Ousia*: Aristotle's Debt to Plato," in *Platonic Investigations*, ed. D.J. O'Meara (Washington, D.C., 1985), 219–46.
63. 1016b31–1017a3; cf. 1018a12–13.
64. 9a4–8.
65. There are passages in the biological works where Aristotle lists sameness of species, of genus, and sameness by analogy, but does not mention focal unity; does this mean that he did not have the notion of focal unity at the time these works were written? No, for in these passages Aristotle is discussing the relationships between parts of animals, and focal unity would be irrelevant in these cases. But Theophrastus is discussing types of unity or sameness in connection with *knowledge*, and it is in just this sort of context that Aristotle introduces focal unity in Gamma 2.
66. It is possible, on the other hand, that Aristotle did make some changes in the light of Theophrastus' objections. One of Theophrastus' points is that it might not be necessary to postulate any suprasensible entities to account for the motion of sensible things (see above, n.5). Now in Lambda, Aristotle simply assumes at the outset that there are suprasensible entities, and his question is of what sort they are (cf. 1069a33–6). In the central books, on the other hand, he is much more cautious, and does not assume at the outset that there must be *some* suprasensible substance; see 1026a10–13, 27–31; 1028b13–15. In regard to the objections to the doctrine of unmoved movers, it is possible that Aristotle simply saw no way of defending his doctrine, and was not sure how to deal with the question of the motion of the heavenly bodies.
67. See 10a22–11a13; cf. James Lennox, "Theophrastus on the Limits of Teleology," in *Theophrastus of Eresus, On his Life and Work*, Rutgers University Studies in Classical Humanities, ed. William W. Fortenbaugh (New Brunswick: Transaction Inc., 1985), 143–63.

The Idea of the Cosmos as an Organic Whole in Theophrastus' *Metaphysics*

Marlein van Raalte

The conception of the cosmos as a living organism pervades Western thought from the earliest stages of Greek antiquity onwards.¹ In this paper I will argue that the appearance of the idea in Theophrastus' *Metaphysics* is especially significant as forming the conclusion of a train of thought that may be said to have been initiated by Plato's effort to "save the appearances" by postulating a world of Ideas, while at the same time I will maintain that the theory was nourished by the Peripatetic interest in biology in particular.

The first section of this paper contains a presentation of those passages in Theophrastus' *Metaphysics* which, in spite of the general aporetic character of the text, seem to reveal Theophrastus' own opinions, and which, I will argue, testify to the idea of the cosmos as an organic whole.² The second section contains some speculation about the nature of the treatise and the context in which it may have originated, and it offers three arguments for postulating as its "systematic date" some time (shortly) after Aristotle's *De motu animalium*. In addition I suggest that the conception of the cosmos of Strato of Lampsacus, Theophrastus' successor as the leader of the Peripatos, may well be viewed as a reaction against Theophrastus' organicistic world view in particular. In a third and final section I attempted to characterize Theophrastus' conception of the cosmos as it may be derived from his *Metaphysics* in the wider context of Greek thought by indicating its affinities with the likewise organicistic theories of Heraclitus and the Stoa, while at the same time doing justice to his debts to the Academic/Peripatetic tradition.

I

Considering the fact that his treatise deals with metaphysics, which concentrates upon the principles of being, we might be surprised to find Theophras-

tus commenting on such items as the copulation of the heron and the life of a day-fly. Theophrastus is not, however, loosening the reins of a hobby-horse. In the beginning of the treatise, he indicates as a starting point the question concerning the *interrelation* of the ultimate principles on the one hand and the objects of sense on the other hand (4a9ff). This serves as a kind of critical test to identify the ultimate principles themselves. In doing so he at least comes up to what he himself expects of a metaphysician, to the effect that he should not restrict himself to the study of the ultimate principles: the third chapter of the *Metaphysics* is actually concerned with the evaluation of the merits of the different philosophers' attempts to account for the rest of the cosmos as well. The metaphysical way of proceeding is then contrasted with that applied in the other sciences: natural science (6b17–22) and presumably also mathematics and the practical and productive fields of knowledge (8b27–9a4), which all “start from the principles” (*apo tōn archōn hē zētēsis*, 6b22)—in this case obviously the “elements” or basic constituents of the cosmos.³ Further on in the treatise (9b6–8), however, Theophrastus seems to disregard these basic principles when he suggests that the starting point of natural science is in the particular, which he contrasts with the intelligible objects (*ta noēta*): “both are, in a way, *archai*—and, one might add, the one for us and the other absolutely so, or: the one an end and the other an *archē* for ourselves.”

Thanks to the obscurity, on this very point, of the prooemium of Aristotle's *Physics* and the extensive comments that it inspired, we have further testimony to Theophrastus' ideas on the subject. According to Simplicius, in the first book of his *Physics*, Theophrastus argued that in our inquiry, both into the heavenly bodies and into the sublunary entities, we depend upon sense perception: the phenomena as such should serve as our starting point—*unless there are some archai more powerful and prior to these*.⁴ So here, as in *Met.* 6b22, Theophrastus does not dwell on the way knowledge of the basic constituents of the cosmos is arrived at, although he would no doubt agree with Aristotle that this knowledge too can only be derived from the *sensibilia*.⁵ This stage, however, he seems to regard as preliminary to natural science itself, which accordingly may be said to “start from the principles.” (In this manner, he seems to have attempted to explain away also the confusion produced by the prooemium of Aristotle's *Physics*.)

The role of these basic and irreducible constituents of nature Theophrastus seems to have assigned to material elements endowed with a specific potency (*dynamis*). Of these elements, “being” may be predicated without restriction: they “are” in the full sense of the word, even if not qualified according to the categories (8a15–7);⁶ they may therefore justly be conceived as “data”, notwithstanding the fact that they are essentially not observable by the senses and that we depend on some sort of analogy for our knowledge of them. In virtue of their respective potencies these basic principles tend to organize

themselves into more complex wholes, the active role being played by one of the four elements, "the hot" (*to thermon*) in particular.⁷ This tendency toward organization as such is not further accounted for and apparently does not require further explanation as far as Theophrastus is concerned. A limit should be set to our search for causes, in the realm of the objects of sense and in that of the objects of thought alike, "for the infinite regress is foreign [to their nature as an *archē*] in both cases and destroys our understanding." (9b4–5; cp. also 9b16–24). In any case, here as well as where the more complex entities are concerned one is apparently supposed to conceive of this tendency as a purely physical one rather than in terms of purposive action (*epheis* or *hormē* rather than *orexis*).⁸

When these basic material constituents organize into more complex wholes, matter comes to be shaped, which may be described as a "change for the better" (8a14–5), since the contrast of shape and order *versus* matter and absence of order coincides with that between good and evil: the evil consists "in indefiniteness and, so to speak, in the form of matter (*hoion hulēs eidei*)" (11a20–1). This process of matter being shaped involves an integration of contraries, on which the unity of the cosmos actually depends (7a9–10; cp. also 8a22ff., 11b11–2).⁹ The idea that *complete* being requires the integration of both contraries means that neither in the cosmos as a whole nor in any part of it can either of these be missed: if the order would extend beyond a certain limit, the change would be, paradoxically, for the worse (7b8). Accordingly, even a hypothetical effort on the part of the divine to lead all things to what is best would involve the risk of destroying the whole of being, apparently by disturbing some equilibrium (11b10–2), for "reality was just good all the time" (11a25–6). Since even the least ordered entities constitute an essential contribution to the totality of being, the good—with an "organicistic" paradox (see also section III, page 205 below)—actually consists in a transcendence of both the better and the worse.¹⁰

The cosmos itself, admittedly the most complete of all things, may be conceived as the limit of the series of entities that are "complete" only in so far as their own level of being is concerned. This inclusiveness of the whole involves a degree of determinateness in every detail, which indeed seems to obtain, as Theophrastus points out with characteristic caution, in plants as well as in inanimate nature (10b21–3). Degrees of determinateness are thus linked with degrees of organicity. The basic hypothesis is that from the basic constituents of nature up to the highest principle assumed there is always *some degree* of coherence between the different parts, which is in proportion to the contribution they make to the whole.

In fact it may be argued that the interrelation of the different constituents of the cosmos, in close connection with its epistemological complement, the relationship between the different manners of knowing involved, is the main

theme of the treatise as a whole. In accordance with the metaphysical subject matter of the treatise, the focus of the interrelation at issue is primarily that between the “first entities” (*ta prōta*, 4a2–3; 4a5)/the intelligible (*ta noēta* 4a10–1) on the one hand, and (the things of) nature (*ta tēs physeōs* 4a11; cp. 4a3) on the other hand—and accordingly, in terms of the opening paragraph, that between the different disciplines concerned.¹¹ One may compare the conclusion of the treatise, which is in close agreement with the introductory remarks (it is curious indeed that the text should have been referred to as “the Metaphysical *Fragment*” for so long): “for *this* is the starting point of the study of the universe, the question which things reality consists in¹² and how they relate to one another” (11b27–12a2).

The key word for the relevant interrelationship between nature and the intelligible is *synaphē*, “connection”, the particular relationship characteristic of entities that are parts of a single, continuous whole.¹³ Rather than being individuals whose contribution to the whole may be optional, the respective constituents are inseparable parts of this whole, bound by some “partnership” (*koinōnia* 4a10), a term which, owing to its essentially social connotations¹⁴ (cp. also *hōs an polis*, 8a5), adds the characteristically organicistic, antiteleological notion of a common interest. In this case the partnership is of a hierarchical nature (prior/posterior; principles/subordinates 4a15–6). This hierarchical—but reciprocal—connectedness pervades the whole of the cosmos, on the understanding that each and every constituent is connected with the rest *to some degree at least*. So, notwithstanding the fact that observation especially of the natural phenomena occupying a lower position in the hierarchy (*ta peri to meson*, 5b12) does not seem to corroborate the hypothesis of an all-pervading *teleological* tendency (since the allegedly “best” kind of movement, namely rotation, is obviously absent: 5b10ff.), for Theophrastus the conclusion is not that these parts are therefore “something unreceptive and unconnected” (5b18).¹⁵ His own, nonteleological alternative is formulated at 7a19ff.: “But again, difficult is the actual assignment¹⁶ of an account to each individual entity by referring to some final cause in all cases, in the case of animals and plants as well as in the bubble itself—unless it happens by virtue of the order and change of *other* phenomena that all sorts of shapes and varieties of those in the air and on earth arise; the main example of which some indeed make the conditions connected with the yearly return of the seasons, on which depends the generation of both animals, plants, and fruits—the sun being, so to speak, the begetter.”¹⁷

The *synaphē* of those natural entities whose connectedness is revealed by their remarkable variety (*morphas te pantoias kai poikilias*) to be of a nonteleological nature (7a23–b1; cp. 10b19–20: “For, if they were for the sake of something,¹⁸ they should have been always the same and should have occurred

always in the same manner") is held to consist either (1) in their being the side effect of phenomena occurring elsewhere in the cosmos (*symptōmata*, 10b19; cp. 10a26) or (2) in their being produced by phenomena occupying a higher level in the hierarchy of being, and which thereby impose a constraint on the phenomena occupying a lower position (*di' heteras anankas*, 10b19; cp. *anankēi tini*, 10a26–7).

Likewise, in 10b26–11a1, the explanation of the various shapes of entities, especially those occupying the lowest levels of the hierarchy (such as plants and inanimate things), in terms of spontaneity (*to automaton*) and "the rotation of the whole" (*hē tou holou periphora*) is mentioned as having some plausibility. In both cases the phenomena are accounted for by the coherence of the cosmos as such. Yet in the first case (*sumptōmata*, *to automaton*) there is no obvious chain of causation, but only the *synaphē* of the cosmos as a whole. In the second case, the constraint is of a hierarchical nature: the rotation of the universe itself gives rise to the movement of the heavenly bodies; the sun by its heat favors certain conditions of the weather (or, the season)—that is, a particular quality of the air (dependent on its mixture)¹⁹ which seems to affect the generation of organic nature.

Now the constraint imposed upon the natural entities by the higher levels in the hierarchy of being may seem to involve circularity in that (as I indicated above) the more "comprehensive" wholes are themselves dependent upon those taking a lower position. It is however a characteristic of an organicistic conception of the cosmos to make a virtue of necessity by elevating this circularity to the position of being the very essence of the cosmos as such. Rather than being a link in a (one-way) chain of causation, this constraint appears merely to be part of the essential internal coherence of the cosmos as a whole, in which each and every part was as it were implied from the beginning.²⁰ In this light Theophrastus' emphasis upon the status of the different ingredients of the cosmos as *parts* of a single whole seems to gain significance. He explicitly states that the diversity of natural phenomena and their notable differences as compared to the orderliness of the (movements of the) heavenly bodies suggest that the cosmos is not an entity without parts, but a composite whole (8a3ff.), which implies that one should not marvel at the abortiveness of a teleological conception (and, presumably, that there is no reason to assume "all is for the best" indiscriminately).

The cosmos, being a whole, is also essentially complete and perfect (*apērtismenon*, 8a5; cp. also *teleōtaton*, 8a7), so that in this sense all may be said to be "in order" (cp. 7a11–3). Accordingly, nothing can be outside the cosmos, in contrast to a consistently teleological conception of the cosmos that forces us to conclude that the things in which "the best" (order/shape; orderly movement) is not manifest do not belong to the cosmos at all. Rather than being attracted by the first principle, they seem to be thrust away from it (*hoion*

apeōsmena, 5b21). Consequently, if the cosmos is conceived as a *holon*, which implies that all of its parts move in the same direction,²¹ the idea of an all-pervading tendency toward the best is easily refuted. It is more likely that the only tendency is one toward completeness, while on the other hand the idea of an actual tendency should not even be taken literally, since in fact the cosmos is just a coherent, differentiated whole, involving both order and disorder, both good and evil.

As a complete and coherent entity the cosmos may be compared to an animal²² (*hōs an . . . zōion*, 8a5); accordingly, there is no need to indicate any particular principle of movement either, since movement, too, it may be maintained, is simply implicit from the beginning: "If even in the case of animals their life demands no explanation, or only this explanation, then surely in the case of the cosmos and the heavenly bodies the motion involved requires no explanation, or no particular explanation, either" (10a16–19). It may therefore be argued that the cosmos is simply "in rotation according to its essence" (*en tēi periphorāi kata tēn ousian*, 10a14), the rotation of the universe being conceived of as some kind of life (10a15–6). This means not only that there is no reason to postulate an unmoved mover, but also that the picture of a "constraint" imposed upon the lower parts of the cosmos by the higher (or more complex) levels appears, here also, to be no more than just one possible perspective. The movement of the cosmos is better conceived as the common product of forces inherent in the different parts of the coherent whole.²³ In fact the influence exercised by the heavenly bodies, *via* the quality of the air,²⁴ upon organic nature consists in their making operative the *archē* or *dynamis* inherent in these organisms themselves. Accordingly, the relation between these levels of being is expressed not only in terms of necessity (*anankē*), but also, if the perspective of organic nature itself is chosen, as a *sympatheia*, which presumably should be interpreted as the natural entity's adapting its own mixture of *dynamis* to the particular mixture of the air surrounding it, thus producing a *symmetria*.²⁵

Just as the intermediate "wholes" may be said to be complete in virtue of the fact that the contraries existing at the next lower level are incorporated (see above), so in the case of the cosmos as a whole all contraries are transcended, but now, as it were, "absolutely." So, in 7b22–3 Theophrastus extends his suspicions against the invariable distinction between activity and passivity to apply in the case of supreme being as well: "Also sense perception seems in a way to applaud the suggestion that what imparts movement need not always be different from what moves because of the acting-and-being-acted-upon; and again if one leads the question further to reason itself and to god" (7b19ff.). In doing so he seems to be criticizing Aristotle's postulate of an unmoved mover as well as his distinction between a *nous poiētikos* and a *nous*

pathētikos.²⁶ So here again, observation of presumably animal life is used especially as an argument in favor of the theory that once the level of the complete organic whole has been reached, the contrast active/passive—like all other contrasts—disappears.²⁷ Even when sense perception fails (9b10ff.), the analogy with animal life somehow promotes our intuition of the mode of being of the ultimate principle, which is that of “organicity”, the cosmos being an organism coincident with the totality of being.

This transcendence, then, seems to be all that is left of the possibility of identifying the first principle by means of an argument “*kath' hyperochēn*”, which Theophrastus in the introductory chapter points out to be the most likely solution to the problem: “It may be necessary to grasp it in virtue of some particular capacity and on account of an excess over the other substances (*dynamei tini kai hyperochēi tōn allōn [ousiōn]*), as if it were god; for divine is the principle of all [things], by virtue of which things both are and endure” (4b13–6).²⁸ Compare Theophrastus' intermediate conclusion at the end of chapter I, where he repeats that the ultimate principle has been determined by our “raising it wholesale to some more powerful and more divine class” (5a9–10; cp. 5a1–2, on the subject of the Aristotelian prime mover). The transcendent nature of the first principle also seems to lend significance to Theophrastus' insistence upon speaking of it in terms of a *negation* of division and quantity rather than as a privation (5a8–11).²⁹ The organicity of the totality of being is, as it were, beyond quantity and beyond division. In view of all this it is not hard to sympathize with Theophrastus' remarkably down-to-earth judgment: “Perhaps, then, it is easy to give an account of it in this manner: it is difficult to do so more clearly and more persuasively” (4b16–8).

Theophrastus' frequent insistence upon the importance of observing differences (*diaphorai*) in order to obtain any kind of knowledge (8b10ff. and elsewhere) may be considered as the epistemological counterpart to the emphasis laid on the role which contraries play in the existence of the cosmos and all its components (see p. 191 above). In fact, this parallelism between mode of being and mode of knowing seems natural to an organicistic world view, in which knowledge consists in a recognition of the position within the whole occupied by the entity from the beginning.

Sense perception “observes” the differences between the different entities (whether parts, individuals, or classes of being) and thus gives hints to our understanding. Progress can be made, for example, whenever a particular observation contrasts with another (and, presumably, also when it contrasts with an existing theory) so that an *aporia* is produced, through which, as we pursue our explorations, some light yet dawns in the darkness.³⁰ As a matter of fact, we can surmise that this light consists in some new analogy or some other kind of similarity presenting itself to us. This interpretation in any case would

make sense of the addition of “as we pursue our explorations” (*zētountōn epi pleon*) in 8b15–6, that is, if we keep our eyes open for differences and causes.

Just as the contrasts between the different constituents of being are transcended in the ultimate, absolute fact of the cosmic organism (see 3 above), so our experience of contrasts may be transcended in our intuition of the absolute truth. Theophrastus quite explicitly formulates the possibility of knowing the “ultimate and first things” (*ta akra kai prōta*, 9b10) in terms of the limit of a process: “Up to a point, then, we are capable of proceeding in our studies by following the route of causation, taking a starting point from an act of sense perception every time. But when we pass to the ultimate and first things themselves we are no longer capable of doing so—whether owing to the circumstance that they have no cause or through our weakness to look at it as if at the most luminous of all things” (9b8–13). Or rather, one may postulate that the *nous* itself takes hold of these data, which accounts for the fact that in this case experience is not deceptive (9b13–6). This ultimate act of awareness, which may be conceived as constituting the limit of similar experiences in our search for knowledge of phenomena lower down in the hierarchy of being, should presumably be identified as the awareness of an analogy, which seems to present itself to us in virtue of all sorts of connections and contrasts inherent in the data themselves. If it is really the analogy with a *zōion*, indeed the obvious candidate, that Theophrastus considers as productive of our intuition about the nature of the ultimate principle, what is touched by this intuition may be referred to as “the principle of organicity” (“completeness transcended,” as it were). In contrast to our procedure in the earlier stages of the attainment of knowledge, where our perceptions and intuitions may prove to be wrong, once the principle of being as such has been reached, our “creative imagination” cannot be deceived,³¹ precisely because the principle of organicity itself no longer involves contrasts or divisions.

Finally, assuming that this interpretation of those passages in Theophrastus’ *Metaphysics* that seem to reveal Theophrastus’ own ideas on the subject brings to light a coherent conception of the cosmos to which Theophrastus could at least have subscribed, the vexed question to what extent he may be considered a faithful follower of Aristotle needs to be reconsidered. On the one hand, there can be no doubt that Theophrastus owes his method, his scientific interest, and even the terms in which he phrases his argument, to the intellectual climate of Aristotle’s environment. Even in his counterexamples to Aristotelian theories Theophrastus was preceded, as was noted before, by Aristotle himself. On the other hand, in drawing conclusions from such counterexamples, Theophrastus seems to part company with Aristotle, although it may be argued that in some respects he seems to follow the

Aristotelian train of thought more faithfully than Aristotle himself was prepared to do. When he came to posing the fundamental questions of metaphysics in a more or less systematic manner, he apparently realized that rather than try to adapt biology to suit the ultimate, unmoved principle, he had better strip the Aristotelian system of its ultimate cause altogether. And, if the above interpretation of the *Metaphysics* has any plausibility, he was aware of the further consequences of this conclusion to the extent that he opted for a different type of explanation. The remarkable parallel between his criticism of the ultimate moving cause and that of the final cause (which amounts to what may be called a rehabilitation of passivity and matter) I consider a case in point.

Now if Theophrastus did in fact favor an organicistic conception of the cosmos rather than a teleological one (which he calls in question both from a practical *and* from a theoretical point of view),³² his alleged correction of Aristotle's theory was by no means trivial. I will mention very concisely some differences between the two world views which may illustrate the impact of the step Theophrastus seems to have taken.

Most importantly, there is an obvious difference between the *types of hierarchy* involved in both views. In both theories we find higher and lower levels of being. In a teleological conception of the cosmos this represents, as it were, a one-way chain: what is higher up in the hierarchy is more formed, more complete, and "better" without reserve. In an organicistic world view, however, the chain of being extends both ways: the cosmos essentially consists in both matter and form, so that, it may be argued, the notion of being "complete" (*teleos*) actually tallies with the ultimate principle which belongs to an organicistic theory more properly than with that at home in a teleological theory. "The best" is what consists of both, that is, of both form and matter and—with what I have called an "organicistic paradox"—of both better and worse. (It may be noted that this is not in itself surprising: form is "better" than matter precisely because it "completes" matter: the lowest level of being, which is the level with the lowest degree of completeness, consists of material elements of which "being" is somehow predicated; matter *plus* form is better than matter by itself; form without matter, on the other hand, does not exist.)

The cosmos as a whole is characterized by its internal coherence and by the continuous interaction between its parts, and each of its components plays its part, however insignificant. Accordingly, there is no need for an additional principle in order to guarantee the movement of the cosmos or the tendency toward completion apart from the organicity of the cosmos as such. Of course, this replacement of a teleological tendency in which each individual item strives after its particular goal by an all-pervading coherence of the cosmos entails a different valuation of other types of relationship between the

different parts of the cosmos. This may be illustrated by the application of the term *symptōma*, which, as we have seen, plays a central part in the explanation of the lowest levels of being especially.

In a consistently teleological world view, *symptōmata* are events happening “by coincidence,” that is, without any causal relation. To adopt an Aristotelian example: someone is walking when the sun is eclipsed, or: something which has just been mentioned actually comes to pass. In other contexts Aristotle uses the term *symptōma* for other types of phenomena as well,³³ but what seems to be significant here is that in Theophrastus the notion loses its negative connotation altogether, and can often be translated as “side-effect” rather than “coincidence.”³⁴ Even in those cases where the causal relationship between the different things of nature is not obvious, the interrelatedness of the phenomena happening *symptomatikōs* is beyond question, since, in a way, *all* things are somehow (or, to some degree) interconnected.

To conclude, I think that all this suggests that Theophrastus, in thinking over the basic questions of metaphysics, was inclined to abandon the major tenets to which Aristotle adhered.

II

In representing Theophrastus as the adherent of an organicistic conception of the cosmos I want to claim no more—and no less—than that this point of view may account in a fairly consistent manner for the selection of the questions posed and the (more or less tentative) answers given in his *Metaphysics*.³⁵ Still it seems to be worthwhile to put the question whether such a conception may be understood in the context of contemporary, especially Peripatetic discussion, and if so, how.

Where information is so tantalizingly scanty one can hope to achieve no more than systematic likelihood. But what I want to propose is that what we have in the treatise known to us as Theophrastus’ *Metaphysics* are Theophrastus’ notes for his first course on metaphysics shortly after taking over the leadership of the Peripatetic school (that is, shortly before or after Aristotle’s death)³⁶—let us say, somewhere between 323 and 320 B.C. This rather speculative proposition demands some further clarification of my assumptions about the nature of the treatise.

In the first place, the hypothesis that the treatise contains Theophrastus’ lecture notes is suggested by the shorthand nature of the text, parts of which are plainly incomprehensible unless considered as annotations, some of them perhaps originally marginal, indicating topics or arguments added as second thoughts.³⁷

As arguments for a date around the time when Theophrastus presumably took over Aristotle’s courses on the subject one may adduce not only his

emphasis on beginning at the (systematic) beginning and his taking for granted his audience's familiarity with Aristotelian doctrines without so much as mentioning Aristotle by name, but, more specifically, the fact that Theophrastus is actually reacting to ideas developed by Aristotle in his *De motu animalium*, which is presumably dated toward the end of his last residence in Athens, from which he reportedly departed in 323 B.C.³⁸

The first passage I would like to refer to in order to make plausible my hypothesis that Theophrastus' *Metaphysics* is at home in the intellectual context of the Peripatos in the years around Aristotle's death is the quotation from Homer in 5b17 which, as has been noted,³⁹ derives from the same passage cited, in a similar context, by Aristotle in *MA* 699b37–700a2. The passage contains a challenge to a trial of strength addressed by Zeus to the other gods, who are invited to try to pull him down from heaven by pulling at a golden rope. Zeus' boast is that they will not only be unable to do so, but in fact it is *he* who, if he would, "could pull [them] up, and earth and sea [with them]."⁴⁰ His overwhelming strength is underlined by the epithet "the supreme adviser" (*hypaton mēstōr*, VIII.22), which Aristotle significantly misquotes as "the supreme of all" (*hypaton pantōn*). As Nussbaum suggests,⁴¹ Aristotle is probably motivated by his wish to score a point against Plato, who in *Tht.* 153C6–D5 refers to the same passage and interprets the rope as a metaphor for the (rotation of the) sun, which would guarantee the permanence of the cosmos. The point made by Aristotle, then, would be that Plato wrongly neglects the Zeus who is actually holding the rope. Notwithstanding the fact that the passage from Homer obviously does not illustrate the absence of motion in the highest principle, it may be granted that Aristotle adroitly selects from the passage those lines that do illustrate an unassailable, unmovable principle which pictures Zeus as being too strong to be pulled down, while conveniently passing over the one verse that characterizes Zeus as an overpowering agent (the one that will be quoted by Theophrastus), and that is obviously at variance with Aristotle's conception of an external, unmoved mover.

Theophrastus like Aristotle before him adopts the Homeric analogy only to turn it against his predecessor. He confines his quotation, as one that is well-known by now, to the single line that shows where the resemblance ends: "Perhaps one might ask the following question, too, why the bodies moving in a circle alone are 'tendency-driven' (*ephetika*), and none of those around the centre [are]—notwithstanding their being movable—: is it because of their incapacity or because the first cause does not penetrate to them?"⁴² No, *that* in any case would be absurd, if it were through weakness; for one would expect it to be stronger than the Zeus of Homer, who says 'I could haul you up, earth, sea, and all' " (5b10–17). Theophrastus thus summarizes his argument against a first principle characterized by rest (*ēremia*) developed earlier in the same

chapter in an allusion that may be appreciated only by a public closely acquainted with Aristotle's treatment of the subject. Not without a sense of humor, it seems, Theophrastus suggests that the alleged unmoved mover is in danger of being inferior⁴³ to the Zeus who was portrayed to serve as an argument in favor of it. Whereas Homer's Zeus hauls up gods, earth, and sea all together, the influence of the unmoved mover does not extend beyond the region of the heavens. To judge from the chaotic movements of the sublunary entities, he may be suspected of being unable to control the remoter elements such as earth and water. Theophrastus might have gone on to claim that the picture of the Homeric Zeus who is *in* the world and takes part in its goings on actually expresses his own conception of the first principle far more aptly than Aristotle's.⁴⁴

But there are even more pertinent reasons for supposing that Theophrastus' conception of the cosmos as an organic whole took shape in the context of Peripatetic discussions of the type represented by Aristotle's *De motu animalium*. I am thinking especially of Aristotle's analogy between *polis* and *zōion* in *MA* 703a29ff.: "We should consider the organization of an animal to resemble that of a city well-governed by laws. For once order is established in a city, there is no need of a separate monarch to preside over every activity; each man does his work as assigned, and one thing follows another because of habit. In animals this same thing happens because of nature: specifically because each part of them, since they are so ordered, is naturally disposed to do its own task. There is, then, no need of soul in each part: it is in some governing origin of the body, and other parts live because they are naturally attached, and do their tasks because of nature." (Nussbaum's translation).

Now when Theophrastus in 8a5 suggests that the cosmos may very well be conceived as a whole of the type of a city or an animal, one may suspect that his argument is directed against the—to his mind—unnecessary complication, exemplified in *MA*, of postulating that the cosmos *does* need a separate monarch.⁴⁵ As appears from *Metaph.* 1075a14–5, Aristotle himself prefers the picture of an army under the leadership of a general, so that the good is both in the order and in the general, and more so in the latter. (Contrast Theophrastus' tendency, indicated above, to treat "order" and "good" as interchangeables.)

A further point Theophrastus wants to make seems to be that the motion of an animal does not need any, even an initial, external motivation. Contrast *MA* 703a35–6, where "since they are so ordered" (*houtō sustantōn*) seems to connote an antecedent process parallel to "once order is established" (*hotan hapax stēi hē taxis*) in 703a31. As a matter of fact, Aristotle *did* explicitly consider the possibility that the cosmos, like an animal, should be self-moving,

only to reject the possibility of (totally autonomous) self-movement even in the case of an animal.⁴⁶ This may indicate that Theophrastus prefers to adapt his cosmology to suit his observations as a biologist rather than taking the opposite course, as Aristotle seems to have done.⁴⁷

A third reason for surmising that Theophrastus' *Metaphysics* might have been nourished by discussions carried on in the same context in which Aristotle's *De motu animalium* took shape consists in Theophrastus' treatment of the problem of soul in relation to Aristotle's theory of *cosmic desire*. For Aristotle the order and preservation of the cosmos are guaranteed by the cosmic desire inspired by an external (as well as eternal) object of desire that is in the best state of being, namely in rest. So, in the cosmos there is a desire for *ēremia*, which, however, is not granted to physical bodies, so that the most divine entities, namely the heavenly bodies, have to be content with the second-best alternative, namely the best kind of motion, circular motion. Now Theophrastus, after pointing to this pitiful failure (5a23–5; cp. also 7b23–8a2)—or rather, by implication, to the superfluity of postulating such a goal—goes on to call into question the status of *kyklophoria* as being the best kind of *kinēsis*: “If the first [cause] is the cause of the circular movement, then it cannot possibly be the cause of the *best* movement: for the movement of the soul is more powerful, and first and foremost that of the thinking faculty, in which indeed the desire originates” (5b7–10). In the preceding argument (5a28ff.) Theophrastus argued at some length that desire involves soul—which is all right with Aristotle—and that soul involves movement,⁴⁸ which is a notoriously awkward question as far as Aristotle is concerned.

To simplify the question in order to clarify Theophrastus' position, it may be maintained that for Aristotle, in contrast to *kinēsis*, which is the process of “becoming actual from being potential,” soul is act(uality) itself.⁴⁹ Hence the prime mover may safely be identified with *nous* (which is *psychē* in its supreme aspect) without thereby endangering its unmoved nature—or, perhaps, one had better say that Aristotle's denial of movement to soul may seem to be *motivated* in the first place by this “metaphysical” consideration. This position is at odds with common usage and not easy to maintain and, in fact, Aristotle does not invariably succeed in avoiding expressions that disagree with his professed convictions on the subject.⁵⁰ This somewhat implausible effort on the part of Aristotle obviously adds to the significance of Theophrastus' criticism that in assigning “the best movement” to the heavenly bodies, Aristotle unjustly disregards the psychic movement involved. Theophrastus' departure from the Aristotelian position is clearly revealed by his explicit reference to the movement (*kinēsis*) of the soul (and of the *dianoia*) in 5b8–10.⁵¹ Theophrastus, as was said above, feels perfectly free to predicate of one

and the same subject both *kinein* and *kineisthai* (so that even the highest principle may comfortably be in movement: *energeia* being for Theophrastus “activity” rather than “act(uality)”⁵²), both *poiein* and *paschein*.⁵³

Apparently, in an effort to systematize the somewhat problematic relation between soul on the one hand and “movement by desire” on the other hand, Aristotle at the end of his career postulated some sort of “material substrate” of soul. In his *GA* and *MA* he introduced a *symphyton pneuma*, presumably in order that soul might be relieved from all activity, “well disposed by nature to impart movement and supply strength.”⁵⁴ Now it seems plausible that when Theophrastus in 6a10 suggests that the desire might actually be innate in the first heaven (*symphyton autōi to oregesthai*; cp. also *physikēn orexin* 5a24), he may be at least inspired by the Aristotelian theory of a *symphyton pneuma*. The remark occurs in a context in which he is stripping the Aristotelian theory of *orexis* of the undesirable effect that the cosmic movement might be just accidental, that is, if there is no guarantee that the first heaven feels the desire permanently, and that it has the power to follow it. What Theophrastus seems to be suggesting is that Aristotle might have considered invoking as an auxiliary postulate some matter that could guarantee the desire of the first heaven as an analogue to the *symphyton pneuma* postulated by him in the case of an animal. The obvious candidate is, of course, the fifth element of *aithēr*, whose analogy with the *symphyton pneuma* was indicated by Aristotle himself.⁵⁵

For Theophrastus, the *aithēr* is an unnecessary postulate just as the *symphyton pneuma* is,⁵⁶ since according to him the rotation of the universe may be conceived of as a kind of life of the universe as such, which is in movement simply according to its essence (10a9ff.; this possibility is advanced as the alternative in the passage under discussion as well: “whether the rotation is of its essence . . . or, if really in virtue of some tendency or desire, accidental” [*kata sumbebēkos* 6a7–10]). Theophrastus’ treatment of the question reminds us of the fact that Aristotle, outside of strictly metaphysical contexts, was actually induced to postulate *aithēr* to satisfy the need for a body with circular motion as its natural motion,⁵⁷ which may have been more to his taste since the *orexis* is disregarded (and, one might add, superfluous as well). On the other hand, according to Theophrastus’ conception of the cosmos, there is no need of, and no place for, an extra body such as *aithēr*, which, according to Aristotle, would be separate from the rest as well (*kechōrismenon*, *De caelo* 269b15). For him, the rotation that belongs to the essence of the universe, like animal life, seems ultimately to be accounted for by the elements with their respective *dynamis* (and *to thermon* in particular) organized into a hierarchically structured whole in virtue of the principle of coherence.

The possibility that the *symphyton pneuma* should be conceived as air with a

special kind of heat,⁵⁸ however, may seem to leave open the possibility of describing the relationship between Theophrastus' and Aristotle's points of view in a more positive manner. The active element of *to thermon*, which is held to organize itself with the other elements into "wholes" that constitute the different levels in the hierarchy of being, may in fact be conceived as an extension of the idea of a *symphyton pneuma* so as to apply to the whole of the cosmos. It follows that Aristotle's alleged "gap-filler" may in fact have inspired Theophrastus to abandon the idea of an external moving cause altogether.⁵⁹

Finally, when speaking of Theophrastus' conception of the cosmos in the context of the contemporary Peripatos, it seems imperative to pay at least some attention to Theophrastus' pupil and successor as the leader of the Peripatos, Strato of Lampsakos, who may have entered the school around 320 B.C.⁶⁰ Although Strato's name is commonly connected with a rejection of Aristotelian teleology, his relationship to his immediate predecessor is often neglected. However, if one gives due weight to the tentative solutions of the metaphysical *aporiai* Theophrastus formulates in his *Metaphysics*, the hypothesis that Strato's reported rejection of the idea of the cosmos as an organic whole might have been directed against Theophrastus in particular seems quite natural. Ancient testimony is concordant in its emphasis upon Strato's reluctance to explain physical phenomena in other than purely physical terms, an intellectual attitude to which he owes the epithet "*ho physikos*." According to Plutarch, for instance, he said that "the cosmos is not a living organism (*zōion*), and that which happens by nature is subsequent to what happens by chance. For the spontaneous (*to automaton*) yields an *archē*, and only thus the various physical processes are brought to pass" (fr. 35W.).⁶¹ Cicero also (fr. 33W.) reports that the only divine power Strato recognized was that which is situated in nature, on which the processes of generation, growth, and decay depend, but which is devoid of all shape and perception.⁶² The poverty of his metaphysical explanation did not fail to strike Seneca, who characterizes Strato as conceiving of a "*deus sine animo*" (fr. 37W.).

Now, as has been indicated above, in his replacement of teleological explanation by a description of physical processes in terms of spontaneity, Strato finds an obvious precedent in Theophrastus. More significantly, however, he deviates from his predecessor in that while taking account of physical processes in terms compatible with an organicistic conception of the cosmos, he refuses to take the final step toward an explanation of these phenomena as being the integral parts of an organic whole. It may be inferred from other contexts, too, that Strato simply refrained from metaphysical speculation.⁶³ In fact it does not seem unfair to characterize Strato's view as a simplification of Theophrastus' theory, for it involves an elimination of the keystone of

Theophrastus' world picture; and according to one's philosophical temperament, this may be regarded with equal justification as either a welcome removal or as an impoverishment.

Surely the relationship between Strato's and Theophrastus' theories stands in need of more detailed examination. In any case, it seems to be a systematic failure to do justice to the arguments of both Theophrastus and Strato, and possibly also a historical injustice against the earlier of the two, to interpret Strato's criticism as directed against and doing away with Aristotle's teleological principle and with Aristotle's first mover.⁶⁴ In fact, the metaphysical explanation that Strato undertook to eliminate seems to be the organicistic conception of the cosmos proposed by Theophrastus rather than Aristotle's teleological variety, which, of course, he thereby did reject, implicitly and *a fortiori*.

III

Now that the picture of Theophrastus favoring the idea of the cosmos as an organic whole seems both to provide a maximum interpretation of his *Metaphysics* and to be plausible within a conceivable historical situation, we can undertake to assign to it a place in the wider context of the history of Greek philosophy.

As I said at the outset, the idea of the cosmos as a living organism is by no means peculiar to Theophrastus. At first sight the world picture presented by Plato in the *Timaeus* (esp. 32C ff.) shows a remarkable similarity, although there, just as in the case of the myth told by the Eleatic stranger in the *Politicus* (esp. 269C4 ff.), the cosmic order originally derives from an agent outside the cosmos itself. That is why, when taken at face value, the Platonic myth cannot be put forward as an example of an organicistic world view.⁶⁵ As a matter of fact, in view of the epistemological implications of the creation of the world after a *paradeigma*, which are essentially nonorganicistic but to which Plato was apparently closely attached, this may be the safest course to follow.

On the other hand, when de-mythologized, the Demiurge just might be interpreted as the "principle of organicity" which represents the coherence of the universe as a whole. Even so, this supposed variety of an organicistic conception of the cosmos yields a fairly low degree of organicity. It is obvious, in any case, that Plato was not primarily concerned with the interrelation and the integration of the parts of his cosmic organism.

Much may also be found among the pre-Socratic fragments which shows a similarity to Theophrastus' conception of the world as an organic whole. This is not surprising in view of the widespread notion now known by the name of

"hylozoism" and the related, but somewhat more specific idea of the universe as a "macrocosmos" complementary to that of man as a "microcosmos" (the whole being known, somewhat confusingly, as the microcosmic world view).⁶⁶

Heraclitus, however, seems to be singled out from the rest of the adherents of a conception of the world as composed of dynamic basic constituents by his rejection of the "thingness" of the constituents, thereby rejecting the possibility of direct acquaintance.⁶⁷ Hylozoism *plus* this particular feature (which was found also in Theophrastus: see I.1 above) seems to qualify a world view as (to some degree) organicistic; and in fact the words "the way up and down is one and the same" (DK60) may be interpreted as a fairly concise statement of the internal coherence of the cosmos, in which each and every part depends for its existence on the existence of all the other parts, whether higher or lower in the hierarchy of being. Likewise, as was argued above, the analogy between the laws of the *polis* and the "law" of the cosmos is—provided that there is no additional postulate of an independent authority who established these laws at first—quite at home in an organicistic conception of the cosmos. More specifically, in Heraclitus' fragments there are also traces of what I have called an "organicistic paradox," exemplified in the case of Theophrastus by the idea that the "good" in the cosmos consists essentially of both the good and the evil. A similar feature in Heraclitus has been observed by Mourelatos, whom I will cite:

If you draw a triangle and place two Heraclitean opposites on the base corners and the term expressing their unity on the apex, it may well be proper to draw a scalene triangle. This would express the fact that one of the opposed terms is often closer to the term expressing the encompassing unity than the other. Thus while there is a master opposition of fire against all things (B90, B31), it is also true that the world is essentially fire (B30). (. . .) God is both war and peace (B67), yet primarily war (. . .). In other words, the equality of the opposites is being compromised. One of the opposites is somehow privileged, closer to the ultimate reality.⁶⁸

Rather than supposing with Mourelatos that "(this) leaning in Heraclitus is a residual feature from older schemes of opposites which otherwise conform to the structure of [the naive metaphysics of things]",⁶⁹ one may suspect that this leaning is in fact a structural feature of an organicistic world view, in which the contrasts and contraries are ultimately not neutralized but transcended.

Finally, I should pay some attention to the Stoic conception of the cosmos, which in fact may be regarded as a signal example of an organicistic world view.⁷⁰

In *SVF* fr. II.1013 von Arnim,⁷¹ a distinction is made between bodies that are unified, bodies that consist of coherent parts, and bodies consisting of

parts that are separate from each other. The first category of a *sōma hēnōmenon* is characterized by its being subject to a single “holding” or “binding force” (*hexis*), such as plants and animals. In the second category, a body *ek synaptomenōn* is a combination of adjacent elements that tend to the completion of one main task, such as cables and turrets and ships. The third body, being *ek diestōtōn*, is a compound of separate and independent entities, like armies, flocks, or choruses. Now the cosmos is obviously a body of the first type, since only in this type of body may there be *sympatheia* between parts, and this is obviously the case in the cosmos, where the heavenly bodies produce all kinds of effects upon conditions of the air and terrestrial phenomena. In contrast to the situation in an army, where the loss of all the other soldiers may be suffered without affecting the survival of some one soldier, in a *sōma hēnōmenon* the loss of, say, one finger affects the body as a whole. The particular form of *hexis* that applies in the case of the cosmos is a “natural” binding (*hypo physeōs*), and rational at that. So here, as compared to Theophrastus’ distinction between *synaphē* and *chōrismos*, a third category is invoked of a unified body, to which those properties are ascribed that characterize a body as an organic whole (and which Theophrastus was content to ascribe to a body with *synaphē* between its parts—the relation of *synaphē* between the parts of a whole being to him a sufficient condition to make a “hen”).

The binding force that belongs to the nature of the cosmos consists in an all-pervading *pneuma*, which, in the case of organic nature, appears in the form of a “*vis caloris*”⁷² which reminds one of the Aristotelian notion of a *symphyton pneuma*.⁷³ Considering its all-pervading character, however, Stoic *pneuma* seems to find a closer parallel in the *dynamis* of *to thermon*, which in Theophrastus’ theory serves as the active element among the basic constituents of being.⁷⁴

A third text that may be relevant here contains a comparison of the cosmos with a *polis* inhabited by gods and men (fr. II.528 von Arnim).⁷⁵ The *koinōnia* by which they are bound (cp. 192 above) is based upon a common participation in the *logos* that has the nature of law (*nomos*). All the rest exists for the sake of this social unity consisting of gods and men (*toutōn heneka*, which by the way, provides a fine example of an allegedly teleological expression in a context which is clearly not teleological in the Aristotelian sense).

What is the significance of all this? If only from fear that the crucial fragment of Zeno *will* turn up and destroy all previous speculation,⁷⁶ one may well be inclined to concentrate on systematic questions rather than on historical ones.

Surely Zeno could actually have heard Theophrastus,⁷⁷ and if Peripatetic

theory did influence the Stoa, Theophrastus would in fact be a more likely channel than Aristotle himself, not only for historical reasons, but also in view of the comparative similarity between the Theophrastean and the Stoic conceptions of the cosmos.⁷⁸ To the parallelism, pointed out above, of the Stoic *pneuma* with the active *dynamis* of *to thermon* one might add, for instance, the use of the term *energeia* in the sense of activity rather than actuality (see p. 202 above),⁷⁹ and the absence of the Aristotelian notion of *eidos*,⁸⁰ since in Theophrastus also the role assigned to form (i.e. *morphē*) is reduced to a tendency toward organization inherent in the elements (pp. 190–1 above).

But, of course, in default of explicit evidence of direct influence, the most one may conclude from such observations is that there is a remarkable affinity between the two world views. If one would divide ancient philosophers according to the type of metaphysical explanation to which they adhered, I am convinced that Theophrastus, judging from his *Metaphysics*, would rank with both Heraclitus and the Stoa. In fact, if “organicism” and “formism”⁸¹ may be conceived as rival models of metaphysical explanation, and if such a thing as an “intellectual climate” has any reality, the affinity observed can be no coincidence.

As I argued above, Theophrastus seems to have arrived at the hypothesis of organicism by doing away with the last shred of formism introduced by Plato in his effort to “save the phenomena” from the effects of Parmenides’ rigorous bipartition. In doing so, he took to its logical conclusion the course taken by Aristotle, who himself, although he was aware of the problems inherent in a consistently teleological conception of the cosmos, was not prepared to abandon the principle of teleology (closely linked with the supremacy of form) and the idea of an unmoved mover. Theophrastus, however, was inclined to do so, and in discussing the fundamental questions of metaphysics he seems to have opted for a different kind of explanation by rejecting the idea of a hierarchy based upon a one-way chain of causation in favor of the notion of a hierarchically structured whole bound by the natural coherence of all its parts.

This final rejection of formism accounts for Theophrastus’ affinity with both Heraclitean and Stoic thought, while on the other hand this particular position in the history of philosophy lends significance to his comparative scepticism as far as the degree of determinateness of the cosmos is concerned. That explains the similarity of the terms he uses to describe natural phenomena to those used by Strato of Lampsakos, who, however, went on to make the ultimate simplification of skipping metaphysics altogether.⁸² In view of this particular intellectual context, Theophrastus’ hypothesis of organicism seems to be notable especially as a harmonization of metaphysical speculation

and scientific interest in organic nature, and it seems fair to conclude that the treatise discussed in this paper may be valued as a systematically significant example of a biologist's metaphysics.⁸³

NOTES

After completing this paper I noticed that the term 'teleology' is also used to refer to "functionality-without-purpose" ("immanent teleology"): see e.g. H.A.T. Reiche, *Empedocles' Mixture, Eudoxan Astronomy and Aristotle's Connate Pneuma*. Amsterdam 1960, p. 26. Since this, in my view, rather confusing extension of the meaning of the term would obscure my argument, I want to emphasize that in this paper I use "teleological" to denote purposiveness in the Aristotelian sense, and accordingly, 'nonteleological' and 'antiteleological' where this point of view is absent or criticized respectively.

1. See esp. G.E.R. Lloyd, *Polarity and Analogy*, Cambridge 1966, pp. 23–72; W.K.C. Guthrie, "Man the Microcosm: The Idea in Greek Thought and its Legacy to Europe," *The Living Heritage of Greek Antiquity*, Den Haag 1967, pp. 56–73; W.J. Verdenius, "Hylozoism in Early Greek Thought," *Janus* 64 (1977) 25–40; id., "Hylozoism in Aristotle," *Graceful Reason: Essays presented to J. Owens*, ed. L. P. Gerson, Toronto 1983, pp. 101–14. See also III below.
2. In my effort to identify the different characteristics of such a conception of the cosmos I have made use of Pepper's analysis of the "world hypothesis," which he subsumes under the name of "organicism" (S.C. Pepper, *World Hypotheses: A Study in Evidence*. Berkeley/Los Angeles², 1948, pp. 280–314.): "The organicist believes that every actual event in the world is a more or less concealed organic process. He believes, therefore, that a careful scrutiny of any actual process in the world would exhibit its organic structure, though some of the processes with which we are generally familiar reveal the structure more clearly than others. The categories of organicism consist, on the one hand, in noting the steps involved in the organic process, and, on the other hand, in noting the principal features in the organic structure ultimately achieved or realized. The structure achieved or realized is always the ideal aimed at by the progressive steps of the process." (*op. cit.* 281).
3. Rather confusingly, Theophrastus in this sentence refers both to the highest principles and to the irreducible particles by one and the same term, *hai archai*, which in fact enhances the pregnancy of the contrast displayed here. In metaphysics, the principles themselves are stronger and "more complete"; in the other sciences, what comes after the principles (sc. the individual entities, as well as the other stages leading up to the comprehensive whole) is "stronger" and of a higher degree of completeness (6b17–20). That the author actually has in view, in the latter case, the particles or elements seems to be confirmed by his treatment of these particular *archai* in the next chapter (6b23ff.); in Chapter V he returns to the ultimate principles of being explicitly: "In the case of the principles however which indeed were the starting-point of our first argument . . ." (7b9–10).
4. Simpl., *In Phys.* 20.17–26 = fr. XVIII W.; P. Steinmetz, *Die Physik des Theophrastos von Eresos*, Bad Homburg 1964, p. 149. Compare also Philop., *In Phys.* 4.8ff. (esp. 5.2–6).
5. This happens by making inferences by analogy from the arts in particular: see 8a19–20; here, as in 4b12–3, the possibility of making use of another "similarity" is included as well. Characteristic of knowledge by analogy seems to be that it is

- based on some proportion ($a:b = c:d$, in which a and b often belong to a different *genos* from c and d); usually a *functional* similarity is involved (in this case the function of material elements analogous to that of the raw material in the arts: 8a11ff.; cp. also *CP* I.19.4.) As a heuristic method Theophrastus is especially fond of the method by analogy, because of its deriving knowledge of one object from another one that is, ontologically speaking, as remote as possible (see 9a7–8). Compare W. Fiedler, *Analogiemodelle bei Aristoteles*, Amsterdam 1978, pp. 21ff.
6. In other words, although “thinghood” cannot be predicated of them, they can be said to be “real” all the same. See also *Sub* III, p. 205.
 7. See Steinmetz, *op. cit.* 169–70. The idea that matter plus *dynamis* is one (in this case *to thermon*) is in keeping with Theophrastus’ objections against the supposition that acting and being acted upon must necessarily involve two subjects: see 7b19–22 and p. 194–5 of this paper.
 8. It may be noted that Theophrastus uses the term *epheis* also when referring to the Aristotelian doctrine of (cosmic) *orexis* (5a15, 5a28, 5b11). *Epheis* seems to be the more neutral (non-purposive) term: see 6a9, where *orexis* apparently specifies *epheis* (cp. *Simpl.*, *In Phys.* 250.22–3: “for what *orexis* is in the animate, that is *epheis* in the inanimate things of nature”). As was noted by Tricot and Reale (*ad loc.*), Aristotle himself does not seem to use the word *epheis* in metaphysical contexts; but compare *Phys.* 192a17–18. In view of Theophrastus’ own conception of the coherence of the cosmos this choice for the nonmarked term may seem to be significant.
 9. In fact 8b4–5, where Theophrastus qualifies as paradoxical the opinion that being cannot exist without contraries, seems at first sight to contradict this interpretation. His criticism, however, is quite consistent with the central position occupied by the contraries in his own theory if it is agreed that here he is referring to the lowest level of being, being that has only some power or potency (*dynamis*) as discussed earlier in the treatise. As we have seen, according to Theophrastus “being” can be predicated of such nonshaped matter without qualification. That this level was in his mind is confirmed by the next remark, which concerns that which is below even the lowest level of being. Those who include in the nature of the universe that which neither is, nor has been, nor will be, he says, “increase the paradox” (8b6).
 10. It is tempting, in this context, to cite Russell’s characterization of Hegel’s convictions on the subject—who may be considered as one of the representatives of a more strict organicistic world view: “(Hegel) admits, and even urges, that what to the empiricist appear to be facts are, and must be, irrational; it is only after their apparent character has been transformed by viewing them as aspects of the whole that they are seen to be rational. Nevertheless, the identification of the real and the rational leads unavoidably to some of the complacency inseparable from the belief that ‘whatever is, is right’.” (*History of Western Philosophy*, Oxford² 1961, 702.)
 11. It may be noted that Theophrastus stretches very far the parallel between mode of knowledge and mode of being—or rather, the actual congruence between the two. (Contrast Ross-Fobes *ad* 4a5: “There is probably some confusion between natural science and its subject-matter”.) The idea, an integral part of the organicistic conception of the cosmos, is of course far from alien to Greek thought in general, and seems to be part of the set of persistent ideas which posterity inherited from Parmenides’ rigorous assertions (see e.g. *DK* B 8.34–6). Compare also 6b17–20.
 12. For this interpretation of *en tisin ta onta* compare 4a17–8 *en poiois*, 6b16–7 *en*

- toutois*; contra Ross-Fobes "the conditions on which real things depend," (followed by Tricot and Reale). The question regards the identification of the different parts of reality; compare 6b17: "reality is only in the principles" (Theophrastus is referring to the opinion of an unspecified group of philosophers). As was indicated above, Theophrastus himself prefers to reckon as a part of reality even being that has only some *dynamis*.
13. 4a9–10; 4a14; 4a20; 4b1; 4b19. The word should be interpreted in opposition to "mere" *haphē* (contact) in which case there is no connection between the parts, and the whole is not continuous (*syneches*).
 14. If the present use of the term would contain a reference to (Platonic) "participation" as Barbotin (*La théorie aristotélicienne de l'intellect d'après Théophraste*, Paris 1954, 66) has it—which I do not believe—it should be noted that the addition of *pros allēla* ("towards each other," 4a10), said of natural objects and the intelligible, would involve a highly critical modification. It is more instructive to compare, e.g. Plato, *Gorg.* 507E5, 508A1 or Arist., *Metaph.* 1075a24–5; cp. also fr. II., 528 von Arnim, referred to in section III.
 15. *adekton kai asyndeton*. I adopt Usener's conjecture of *asyndeton*; his earlier conjecture of *asyneton*, adopted by Ross-Fobes, seems to be less appropriate, primarily since the word seems to denote a deficiency in the use of the intellectual faculty ("void of understanding, witless," LSJ s.v.), rather than the absence of intelligence as such.
 16. I read, with Usener, *auto to*—a turn of phrase which recurs in this treatise with remarkable frequency and often seems to indicate a slight change of focus in an aporetic context: see e.g. 6a6–7; 6a13; *et passim*.
 17. As appears in other parts of the treatise, Theophrastus' non-committal way of expressing himself ("unless it happens . . ."; "some make . . .") does not imply that he is not an adherent of this theory; see also *Ign.* 44, where he speaks of the heat of fire as generative (*gonimos*) of animals and plants; also Steinmetz, *op. cit.* 161. In fact such theories seem to have been part of the explanation of natural phenomena within the Peripatos in general: cp. e.g. Aristotle *GA* 777b27ff. For the influence of the sun upon the weather or the seasons, see e.g. *Vent.* 10; *CP* III.2.6; 3.1; 4.2. (A similar influence is ascribed to the (other) stars: e.g. *Vent.* 17; *CP* II.19.4; *HP* II.4.4; cp. Arist., *GA* 777b24ff.)
 18. Reading *tou* instead of *toutōn*: Compare Usener, "Zu Theophrasts metaphysischem Bruchstück," *RhM* 16 (1861) p. 278.
 19. See e.g. *CP* III.3.1; I.20.4 (*tēi krasei tou aēros*).
 20. Pepper's category of "implicitness." "When we find the organic whole in which the contradictions of the fragments are resolved, we acknowledge that these fragments were details in this whole all the time and that their apparent fragmentariness was an error and an illusion." (*op. cit.* 304). One may compare Aristotle's distinction between potential and actual priority, the parts of a *holon* being potentially prior to the whole, while actually the whole is prior to its parts (*Metaph.* 1019a7ff.). This implies that "die angenommenen Teile teilweise nur theoretisch bestehen und ohne der Natur Gewalt anzutun nicht ablösbar sind." (K.S. Wallach, "Aus der Bedeutungsgeschichte von *Holos*," *Glotta* XLV (1967) 32).
 21. See e.g. Arist., *De Caelo* 270a3–5.
 22. An animal exemplifying the type of whole all of whose parts are permanent—such, presumably, in contrast to a plant, since in that case nonpermanent and separable phenomena like fruits should perhaps be reckoned as parts of the whole as well: see *HP* I.1.1–3. Compare Verdenius' suggestion that Aristotle, when calling the

universe *empsychos*, "avoids the term *zōion* probably because in his vocabulary this usually means 'animal.'" (*op. cit.* 1983 p. 102). That the idea of the cosmos as a *zōion* is actually objectionable to Aristotle—notwithstanding his use of biological analogies to explain cosmological phenomena: D.E. Hahm, *The Origins of Stoic Cosmology*, Ohio 1977, 64—is argued in section II, pp. 200–1.

23. It may be noted that Theophrastus' conception of the cosmos as an organic whole with *synaphē* between its parts provides a solution for the problem indicated by Eudemus, another of Aristotle's pupils who found fault with the concept of an unmoved mover, to the effect that "a partless" entity cannot be in contact (*haphē*) with anything else. See Eudemus, fr. 123a and b W.; cp. F. Solmsen, *Aristotle's System of the Physical World*, New York 1960, pp. 193–4.
24. See e.g. CP I.7.5; I.12.9.
25. See e.g. CP I.7.4 and I.10.1.
26. Compare Prisc., *Metaphr.* 27.27–8 and 28.6–9. Cp. also 28.20ff., where, however, Themistius' version seems to be preferable in many respects (see Barbotin *op. cit.* fr. IV).
27. Cp. also fr. I Barbotin, (= Them., *In De an. Z*, 107–8), where it seems to be implied that Theophrastus explained Aristotle's statement of a *nous* which enters (sc. the body) from outside (*exōthen*, Arist. *thyrathen*: GA 736b28) *not* in terms of an addition (*hōs epitheton*), but as though it was included in the organism right from the start (*hōs en tēi protēi genesēi sumperilambanomenon*).
28. It may be noted that *diamenein* is used of the persistence through time of a living organism especially; see e.g. HP IV.13.6; CP I.16.1.
29. "By saying that it is nondivisible and nonquantitative", "rather . . . than take from it the possibility of division and having parts" (that is, rather than saying that it is *adiaireton*). Cp. Arist., *Metaph.* 1004a9ff.; or, with a helpful example from MA, the situation is analogous to sleep rather than to an erection (*ouch hekousios* vs. *akousios*, MA 703b3ff.).
30. Compare Pepper, *op. cit.* 291: "According to the organicist, facts are not organized from without; they organize themselves. Scientists and philosophers and the common man when he thinks are but the channels of integration and, like spouts of a fountain, serve best when they interfere least and let the materials take the form implicit in them."
31. Cp. Pepper, *op. cit.* 314: "If this view (sc. organicism) had brought to light nothing else than the doctrine of the creative imagination (which is entirely an organicistic doctrine and unknown except in the barest glimmerings before this world view began to emerge), it would have earned a high place in the history of cognition."
32. See 10a23: *allōs ho aphorismos ou rhaidios*, which should obviously be interpreted in the light of 7b5–8: "[these questions ask for] a delimitation (*aphorismos*) how far the ordered extends, and why *more of it is impossible* or the change would be for the worse."
33. In some cases, it is implied that there is some causal connection between the events occurring *symptomatikōs*—only not a teleological one (e.g. GA 777b8).
34. Coutant and Eichenlaub, in their edition of *De ventis* (1975), suggest translating *kata sumptōma* by "in conjunction"—since "the usual meaning 'by chance' could not conform to an attempt to ascertain cause-and-effect relationships" (p.74).
35. This means, among other things, that I have made no attempt to harmonize the conclusions which may be derived from this treatise with opinions on similar topics to be found elsewhere in Theophrastus' writings. Without underestimating the importance of trying to reconcile the Theophrastus of the *Metaphysics* with the

author as he manifests himself in the botanical works for instance, I leave aside as (methodologically) secondary the question to what extent this can be done, and what impact it would have upon our interpretation of the *Metaphysics* if it could *not* be done. Still, I would stand up for the thesis that in his other works, too, Theophrastus is never expressly at variance with the theory contained in his *Metaphysics*. With regard to the occasional teleological expressions used by Theophrastus, one should realize that phrases like "nature always sets out to achieve what is best," or "nature does nothing in vain" seem to be no less appropriate when "the best" is interpreted as "completeness" in the sense of an organic whole consisting of both matter and form. In this case also the lower levels of being may be said to be "for the sake of" the higher ones, although, from a different point of view, the reverse could be maintained as well. Cp. also *Sub* III, p. 206.

36. See Diogenes Laertius V.36; Regenbogen, *op. cit.* 1358; J.P. Lynch, *Aristotle's School*, Berkeley 1972, 97–8; F. Grayeff, *Aristotle and his School*, London 1974, 44. *Contra* F.H. Sandbach, *Aristotle and the Stoics*, Cambridge 1985, 2, who holds that Theophrastus retired with Aristotle to Chalcis and returned to Athens only about 317 B.C.
37. E.g., 5a17; 5a27–8; compare also 8a2. See also Regenbogen, "Theophrast-Studien I: Zur Analyse der Historia Plantarum," *Hermes* 19 (1934) 79–80 (speaking about *HP* I): "Es ist . . . eine Eigentümlichkeit Theophrastischen Stils, die auch in dem metaphysischen Bruchstück stark hervortritt, dass er um so kürzer, skizzenhafter, geradezu nur in Andeutungen schreibt, je abstrakter, allgemeiner und grundsätzlicher er sich auslässt. Es spricht aus solchen Zeilen eine ausserordentliche Gewöhnung an abstraktestes Denken und das Vertrauen, sich an einen Hörer- oder Leserkreis wenden zu können, der bereit und fähig ist, auch der leisesten Andeutung nachzukommen, der sachlich und terminologisch so weit geschult ist, um die übersprungenen Mittelglieder ohne weiteres ergänzen zu können. Vielleicht, wenn es sich um ein Manuskript zum Vortrag handeln sollte, blieb manches auch weiterer Ausführung vorbehalten."
38. See M.C. Nussbaum, *Aristotle's De Motu Animalium*, Princeton 1978, p.12.
39. See Ross-Fobes *ad loc.*
40. *Hom. Il.* VIII.18–24. Aristotle transposes 20 to follow 21–2; Theophrastus cites 24.
41. *Op. cit.* p. 321.
42. *hōs ou diiknoumenou tou prōtou*; cp. Pseudo-Arist., *De Mundo* 397b33: "... it is the nature of the divine to penetrate to everything" (*epi pan diikneisthai*,) where in the immediate context reference seems to be made to the same passage from Homer: see A.P. Bos, "Notes on Aristotle's *De Mundo*," *Philos. Inquiry* I (1979) 150. The deity referred to in *De Mundo* is an almighty prime mover dwelling on the outskirts of the heaven; the (comparative) disorder of the earthly phenomena is accounted for by their remoteness from the divine authority. Elsewhere, the deity is compared with the leader of a chorus, the Great King, a general, a leader of a *polis*, an operator of machines, and a man who runs a puppet-show. Cp. pp. 200–1.
43. For Theophrastus' claim that the first cause ought to be *stronger* is acceptable only as a rhetorical *façon de parler*; stronger it could not possibly be, but it is legitimate to require that it be *equally strong*.
44. One may in fact appreciate Theophrastus' effort to leave unspecified the gender of the principle discussed, so as to create a smooth comparison with the Olympic god: *tou prōtou* 5b14; *ischyroteron* 5b15.

45. Accordingly, Theophrastus may seem to complete the series of analogies individual/state, individual/cosmos, which is ignored by Guthrie *op. cit.* p.65: "the analogy between state and universe, which the Renaissance worked out in such loving detail, is not prominent in Greek thought, but makes its appearance in the general idea of the universality of law." See Lloyd *op. cit.* 158ff.; also p. 206.
46. *Phys.* 252b17ff.; 253a7ff.; 259b1ff.
47. To this extent I disagree with the valuation inherent in Preus' conclusion that "Aristotle was the first philosopher we know to make biological individuals metaphysically primary." (A. Preus, *Science and Philosophy in Aristotle's Biological Works*, Hildesheim/New York 1975, p. 259.)
48. This seems to be the purport of the (apparently corrupt) text in 5b5–7, too: although sense perception is a kind of being affected (through other media, such as *poroi*, *aēr*, the senses: see e.g. *Sens.* 26, 85, and *passim*), yet they are produced, or take place, in soul (i.e. involve activity on the part of the soul).
49. See e.g. *Metaph.* 1043a35–6; 1077a32ff.
50. See e.g. Hicks *ad Arist., De an.* 408b13ff.: "In spite of the preference which A. avows for the more correct expression he goes on using the less correct form of ordinary language throughout the treatise and talks like other people . . . of the soul as the subject of emotions, sensations, and processes of thought, just as if he had never laid down this canon."
51. Cp. H. Siebeck, *Untersuchungen zur Philosophie der Griechen*, Freiburg i.B. 1888, p.224: "Der Satz, dass auch das (reine) Denken Bewegung sei, enthält eine Modifikation der ursprünglichen Lehre, welche den wesentlichen Unterschied zwischen Gott und der Welt aufhebt."
52. See 7b13–4, where *energeia* is introduced to replace the *ēremia* characteristic of Aristotle's first principle; cp. also 5a7–8 *tēn energeian kai tēn ousian apodidous*. In my view, this passage maximizes the correspondence between the Aristotelian and Theophrastus' own conception of the "first principle"—albeit a merely verbal one, as appears from the different value attached to the word *energeia*.
53. It may be noted that the opposite situation is described in *Arist., MA* 702a11ff. ". . . since the passive (*to pathētikon*) and the active (*to poiētikon*) have the nature which we have often ascribed to them, then whenever it happens that both the active and the passive occur, and neither of them falls short of its definition in any respect, at once the one acts and the other is acted upon . . . (The process happens actually) at the same time and at once because of the fact that the active and the passive belong to those things which are naturally relative to each other."
54. *MA* 703a18–9; Nussbaum's translation. See Nussbaum *op. cit.* 156: "Desire is an enmattered process, and we want to find out what the bodily 'moved mover' is; we need an organ, or some stuff, that is capable of receiving perceptual stimuli and initiating bodily responses. The mysterious *pneuma* is invoked to fill this gap."
55. *GA* 736b29ff.; for discussion, see Nussbaum *op. cit.* 158ff.
56. Compare J. Longrigg, "Elementary Physics in the Lyceum and Stoa," *Isis* LXVI (1975) 219; Steinmetz *op. cit.* 163f. As a matter of fact, the present passage seems to corroborate Steinmetz' suggestion that Taurus' testimony (*ap. Philop. Adv. Procl.* XIII.15) to the effect that Theophrastus did postulate "a fifth body, *to kyklophorētikon*" was inspired by an aporetic passage treating of the Aristotelian doctrine involved.
57. *Arist., De caelo* 269a2ff. That the "soul-like characteristics of matter [sc. the soul-heat in *pneuma*] may in fact be connected with the natural motions of matter" has been argued by J. M. Rist, "Aristotelian Teleology," *TAPA* 96 (1965) 341, who in this

- article maximizes the Aristotelian position in a manner which comes quite near the idea of an innate desire.
58. Nussbaum *op. cit.* 162. See, e.g., Arist., *Juv.* 469b8ff.
 59. This seems to be plausible especially if Rist's interpretation of Aristotelian teleology (see note 57 above) holds water.
 60. M. Gatzemeier, *Die Naturphilosophie des Straton von Lampsakos*, Meisenheim am Glan, 1970, p.35.
 61. Plut., *Adv. Colotem* XIV.1115B. The context of this passage is Academic/Peripatetic, and the point at issue concerns the (mistaken) tendency to disregard the differences between the several philosophers involved. As far as Strato's rejection of the idea of the cosmos as a living organism is concerned, it seems most likely that Plutarch holds that this criticism was directed against Plato (although the phrase beginning with *kai teleutōn* seems to leave open other possibilities). Since, as has been argued below, both in the *Timaeus* and in the *Politicus* ideas of a (quasi-) organicistic nature are found, this supposition is not surprising. However, since in Theophrastus' *Metaphysics* we have independent evidence to the effect that Theophrastus at least *suggested* that the idea of the cosmos as a living organism might solve some of the *aporiai* of (esp. Aristotelian) metaphysics, the supposition that Strato's criticism in fact concerned Theophrastus' conception of the cosmos in the first place seems to have some plausibility.
 62. *ND* I.35; cp. also fr. 34 (Lactantius, *De ira dei* X.1).
 63. Gatzemeier, *op. cit.* 142ff.
 64. Gatzemeier (*op. cit.* 146) seems to be led astray by Simplicius' report that while Theophrastus was a faithful follower of Aristotle, Strato took a different course. His explicit amazement, for which he claims to find ancient authority, at the fact that Strato diverged so far from a doctrine he was supposed to subscribe to seems to be beside the mark particularly if it is realized that he is likely to have entered the Peripatos under Theophrastus' leadership—and in fact may have developed his supposedly heretical doctrine under his influence.
 65. Cp. Lloyd, *op. cit.* 284–5.
 66. See note 1 above.
 67. A.P.D. Mourelatos, "Heraclitus, Parmenides, and the Naive Metaphysics of Things," *Phronesis* Suppl.I (1973) 16–48. Mourelatos' conception of the "naive metaphysics of things" is summarized in three postulates about the alleged "character-powers" (*dynamis*): (a) thinghood; (b) equality of status and independence, (c) recognition of affinities and polarities. The first two postulates are obviously alien to an organicistic world view. Heraclitus denies to these basic constituents a real, corporeal existence "in saying that the opposites are complementary, that each is conditioned by the other, and that both are conditioned by the encompassing unity to which they inextricably belong," Mourelatos, 36.
 68. Mourelatos, *op. cit.* p.39.
 69. Mourelatos, *op. cit.* p.40.
 70. In Pepper's terminology, Stoic cosmology shows a remarkably high degree of both determinateness and organicity—remarkably higher, in any case, than is the case in Theophrastus' (supposedly organicistic) world view.
 71. Fragment II no.1013 = II p.302.17ff. = Sext., *adv. Math.* IX.78; cp. also II, 191.34.
 72. Von Arnim I. no. 513, 115.4ff.; = Cic., *ND* II.24. Compare D. E. Hahm, *op. cit.* p. 164.
 73. Compare Hahm, *op. cit.* p. 41: "the Stoic active principle, though it produces form,

is not form. It would appear that the Stoics have actually modified Aristotele's doctrine; but such an inference is, at best, premature."

74. For the suggestion that Theophrastus may actually have preceded the Stoics in referring to the active principle as *to pneuma*, see Siebeck, *op. cit.* 225, who adduces as testimony Clem. Alex., *Protr.* 5.58.17. As was argued above, Theophrastus' recognition of *pneuma* as a principle cannot be inferred from his *Metaphysics* in any case; in fact it seems not unlikely that Clemens' report to the effect that "Theophrastus supposed god to be [*i.a.*] *pneuma*" should be accounted for by his adopting the Stoic name for what Theophrastus more probably seems to have referred to as *to thermon*.
75. II 169.21ff.; = Ar. Did. *ap. Eus., Praep. Evang.* XV.15 p.815.6.
76. Compare F.H. Sandbach, *Aristotle and the Stoics*, Cambridge 1985 p.57.
77. Hahm, *op. cit.* p.227: "It would be strange if Zeno had lived in Athens, thirsting for instruction, without having heard so much as a single lecture of Theophrastus."
78. See already Siebeck, *op. cit.* (1888); cp. Sandbach, *op. cit.* p.31; also E. Grumach, *Physis und Agathon in der Alten Stoa*, Berlin 1932.
79. Sandbach, *op. cit.* p.53; likewise, "the word *dynamis* itself never seems to carry the meaning 'potentiality'; rather it means a 'force', an 'active power' " (*loc. cit.*).
80. Sandbach, *op. cit.* p.36–7. There seems to be no need, therefore, if one decides in favor of some influence, to conjecture that Zeno developed his thought on the subject from Academic rather than from Aristotelian concepts, as Sandbach, p. 36 does.
81. Pepper's term.
82. Compare H. Stroh, "Theophrast und Poseidonios," *Hermes* LXXXI (1953) pp. 294–5: "Dass Poseidonios sich besonders von Theophrast anregen lassen konnte, wird wohl auch dadurch begründet sein, dass im Werk des letzteren (und seines Schülers Straton) der spekulative Oberbau bereits abgetragen war, der in des Aristoteles Naturerklärung überall noch, im Sinn einer "doppelten Physik", hineinwirkt. Im Werk Theophrasts ist—für eine kurze Zeit—die griechische Naturwissenschaft so unspekulativ, unschematisch geworden, als es ihr überhaupt möglich war; freilich um den Preis der Resignation gegenüber den "grösseren" (kosmologischen) Problemen." (As appears from the above, I am convinced that this last remark holds water as far as Strato is concerned, but not for Theophrastus.)
83. I am much indebted to Professor C.M.J. Sicking and to Dr. J.M. van Ophuijsen for discussing this paper with me and for various helpful suggestions affecting both matter and form.

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A more detailed interpretation of the text discussed in this paper will be published in my book *Theophrastus, Metaphysics. Translation and Commentary* (forthcoming).

11

The Aporematic Character of Theophrastus' *Metaphysics*

John Ellis

The nature of the significance of the *Metaphysics* of Theophrastus is a subject of some controversy. In this essay, I would like to focus on one extreme in the debate presented to the 1985 Theophrastus Conference by Marlein van Raalte entitled, "The Idea of the Cosmos as an Organic Whole in Theophrastus' *Metaphysics*." Van Raalte believes that Theophrastus held an organicistic world view, a view which she argues is nonteleological in nature and, as such, is fundamentally non-Aristotelian. Of course, she readily admits that Theophrastus gained much of his methodology and insight from his master, yet she also believes that not only did Theophrastus question the principle of teleology and the conception of an immobile mover in his *Metaphysics* (on which point all seem to agree), but he in fact also abandoned them in favor of a different world view altogether. And since the particular world view he favors turns out to have striking similarities with that of the Stoics, Theophrastus' position would, according to van Raalte, be of historical interest. For if she is right, the work of Theophrastus would enhance our understanding of the way in which it was possible for Greek philosophy to make the transition from an Aristotelian to a Stoic world view.

At the other extreme is the view expressed by W.D. Ross. Ross believes that Theophrastus' "standpoint is, in the main, that of an Aristotelian," and, though he is capable of criticizing the work of his master, "the essay shows no trace" of a "constructive philosophical idea." In Ross's opinion,

Theophrastus is first and foremost a man of science. He has enough interest in metaphysics to ask intelligent questions, but there is nothing to suggest that he had either the interest or the ability that were needed to lead him to successful answers to his questions. Thus the value of the essay lies chiefly in the partial picture it gives us of the state of opinion in the Lyceum in the first generation

after Aristotle, and in the few additional facts it gives us with regard to the philosophical systems earlier than Aristotle's.

Ross does believe, however, that Theophrastus has some "positive suggestions" to make, the "most important" of which are:

(1) that there is no need to seek for an explanation of movement (as by an unmoved first mover), movement rather belonging to the very essence of things that have it (10a9–21, cf. 6a5–14); and (2) that many features of the universe are to be explained not teleologically but as the inevitable result of movements of the heavenly bodies (7a22–b5, 10b26–11a1, 11b24–12a2).

However, "in the first of these suggestions he is anticipated by Plato and in the second by Aristotle." For Ross, then, Theophrastus' opinions are, if at all different from Aristotle's, little more than suggestions. He can hardly be expected to have developed a rival world view. Moreover, "there is no evidence that Theophrastus ever wrote a substantive work on metaphysics, nor does the present essay suggest that a metaphysical treatise by him, had he written one, would have been a very valuable work."¹

Such are the broad outlines of the debate. But given the character of the *Metaphysics*, it is difficult to embrace confidently either alternative. The work, as Ross points out, is "aporematic throughout,"² and even in those places where Theophrastus apparently offers a solution to a given question, it is hard to be certain that he is expressing his own views. The attribution of any definitive assertion to Theophrastus must therefore be made with caution. And, indeed, it almost goes without saying, the attribution of any definitive *philosophy* to Theophrastus based on this work is highly problematic.

In his commentary on Theophrastus' *Metaphysics*, Giovanni Reale seems outstandingly sensitive to the problematic nature of the treatise. An example taken from his work will serve as an illustration of the difficulties involved with pinning Theophrastus down to any particular position. Reale notes a point made by another commentator, that at 10a9–21, Theophrastus is clearly opposing Aristotle's proof of the immobile mover. There Theophrastus suggests that the movement of the heavens may simply be a part of their essence, and indeed "a sort of life of the universe." The movement of the heavens may sufficiently be explained by that very fact, just as the life in animals needs no more explanation than that it is part of their essence. Reale adds the following caution:

Let us recall that Theophrastus has already opposed the proof of the immobile Mover in 7b15–19 by qualifying it as *purely verbal* and *not worthy of being believed* (7b18). It is well, however, not to forget that these are not definitive affirmations, assertions already beyond discussion, but they constitute dialectical moments of a diaporetic procedure which are not separable from the contexts in

which they are found. Especially the passage we are now considering, which has the function of counterbalancing an antithetical moment, the thesis which was first sustained: that astronomy does not unite the supreme principles, which are the realities beyond the objects about which it is concerned; the antithesis, makes the motor of the heavens its life and essence, and it would render useless the inquiry into further causes, and consequently render useless another science beyond astronomy.³

The complete passage (9b16–10a21) may be divided into three parts. The first (9b16–24) serves as an introduction of sorts, the basic idea being that the search for the proof (*logon*) of things should be limited to those cases where proof is possible. It is, of course, difficult to determine where one should draw the line, but the point is that proof should not be expected in every case. In the second part (9b24–10a9), or, according to Reale, the thesis, Theophrastus turns to a case where more proof seems to be required, namely astronomy. For unless astronomers extend their inquiry into “the first things in nature,” the objects they study will be subordinate and posterior to some other things. And in the third part (10a9–21), or the antithesis, Theophrastus provides an example of where no further proof is required, or, at least, where no further proof should be expected. This is the case of the movement of the heavens, which need not be explained by introducing the notion of the unmoved mover, but may simply be analogous to the case of life in animals and plants. Just as the latter would not be what they are without life, so the heavens would not be what they are without their rotary motion.

The dialectical nature of this passage is obvious. What, if anything, is Theophrastus actually asserting here? We must not forget that the passage also has a diaporematic character. To be sure, part one is clearly a view to which Theophrastus subscribes, for he says that it is *necessary* (*anakaion*, 9b18) to limit one’s inquiries. This point does not appear to be one he considers disputable. Part two, however, is another matter, for the conclusion of the section is expressed in hypothetical form: “If then astronomy contributes to our knowledge, but not with regard to the first things in nature, the things that are most dominant must be other than and prior to its objects” (10a–7). It may be that Theophrastus is here criticizing the astronomers by saying that they *in fact* do not carry their researches far enough. Yet, the possibility is open that he is simply stating what is required if astronomy is to be a complete science. The safest interpretation is surely along the lines of Reale’s suggestion that the main point of the example is not to make an assertion about the astronomers, but to illustrate one case where more proof seems required. If pressed on the use of astronomy as a good example of this type of case, Theophrastus may or may not have had more to say on the matter. The hypothetical conclusion is meant to show that astronomy *could* be an appropriate example. But it is, of course, noncommittal.

Part three, Reale's antithesis, is again noncommittal, though there may be some reason to suspect that Theophrastus favors this opinion. The example is meant to illustrate, as has already been said, a case where our inquiries may be limited. As with the thesis, the conclusion of the antithesis is expressed hypothetically: "Surely, then, if the life in animals does not need explanation or is to be explained only in this way, may it not be the case that in the heavens too, and in the heavenly bodies, movement does not need explanation or is to be explained in a special way?" (10a16–19) In this case, we can be sure, I believe, that Theophrastus is committed to the protasis. For, as he says, it is of the essence of plants and animals to be in movement, since if they are not, they are plants and animals in name only. Yet, he appears to be in doubt concerning the apodosis. Not only is the conclusion hypothetical, but so also is the initial suggestion that sets up the analogy. After the apparently definitive assertion that being moved is *proper* to nature in general (*to ge kineisthai . . . oikeion*), and especially to the heavens, Theophrastus raises the question whether activity, and perhaps, in consequence, motion, is of the *essence* of particular natural objects. If so, then likewise the motion of the heavens (namely, rotation) would also be of their essence. Note, however, that these ideas are brought up in a characteristically aporematic (hypothetical) fashion. It seems clear to Theophrastus that being in movement is *oikeion* to natural bodies, but at least aporematic that it is *tēs ousias*. Hence, it does not seem warranted to claim that Theophrastus positively adopts the antithetical position.

Nor does it seem warranted to view the refutation of Aristotle's argument for the immobile mover as an intention of the passage (as Tricot seems to do). The main point, as we have seen, is to show, by means of two examples, that in some cases one should push one's inquiries further, while in others, one should not push one's inquiries beyond what is required or possible. It is true that Theophrastus mentions the argument for the immobile mover at the end of the passage (10a19–21), but it is evident that its connection with the passage is an afterthought: "The present problem [*aporia*] connects in a way [*pōs*] with the imparting of motion by what is unmovable." The *pōs* is not further elaborated, but we understand, of course, that if this *aporia* could be secured, there would be no need for the immobile mover. If Theophrastus had indeed been positively asserting the view in the antithesis, would he not have made a more positive assertion as to the way in which it connects with Aristotle's argument? It would be surprising if not, since, as Reale mentions (quoted above), it seems that he had some reasons to suspect that the argument was merely verbal.

It would then seem that the most one can say is that Theophrastus *perhaps* favors the view in the antithesis, and that he disfavors Aristotle's argument for the immobile mover. He would like, I believe, to be able to support a counter theory, but, as far as can be gathered from the *Metaphysics*, he does not feel

secure enough in any theory to do so. Indeed, the very idea of the antithesis itself was raised at 6a5–14 as a possible subject of inquiry, but nothing substantive was made of it, and it was dismissed as being too far afield. Was it on his mind when he wrote the passage at 9b16–10a21? Perhaps. It is also at least plausible that the methodological consideration of part one was inspired by his (and of course Aristotle's) biological researches, and in particular the opinion that motion is of the essence of animals and plants. No further explanation is needed in this case, so why should the heavenly bodies not be analogous?

It is evident that we have begun to speculate. But after the account given above, perhaps there is some plausibility in these speculations. At any rate, I hope that this much is clear from the foregoing: It is not easy to pin Theophrastus down to a definitive position. Even in one of the most obvious cases of a Theophrastean position, one finds that his attitude toward that position is not so obvious. Reale's warning seems to be well founded. One must be sensitive to the aporematic character of the work, and, especially in some cases, to its apparently dialectical nature.

It is my judgment that van Raalte does not heed this warning. I will not attempt to support this judgment by a point-by-point analysis of her paper. In the following I will examine one of her central theses and attempt to show that in this particular case, she has not been sensitive enough to the special character of Theophrastus' treatise. I am not attempting, it should be noted, a refutation of van Raalte's overall thesis. That would require showing that Theophrastus *definitely* does not hold an organicistic position. But my aim in this essay is to show the difficulty involved in attributing any definitive view to Theophrastus based on his *Metaphysics*—and the same difficulty would seem to be involved in denying that he held a particular view. Indeed, van Raalte is also denying that he held a certain view, namely, the Aristotelian. So it would seem that the best way to refute van Raalte would be to show that Theophrastus is in fact, as Ross maintained, "in the main an Aristotelian." It should also be noted in this regard that organicism could not be more opposed to formism, the latter being the sort of world hypothesis that Aristotle undoubtedly held.⁴ What seems to be required, then, is a close scrutiny of Theophrastus' other works, especially the biological, and an evaluation of those works in terms of which world hypothesis they exhibit more: organicism or formism. And since that project cannot be accomplished now, I want to avoid being in any way unfair to van Raalte. So the following is merely meant to show some reason for my skepticism with regard to her thesis.

One of van Raalte's central theses is that Theophrastus rejected teleology.⁵ In section I.2 of her paper, she cites one passage of the *Metaphysics* as support:

His own, non-teleological alternative is formulated at 7a19ff.: "But again, difficult is the actual assignment of an account to each individual entity by referring to some final cause in all cases, in the case of animals and plants as well

as in the bubble itself;—unless it happens by virtue of the order and change of *other* phenomena that all sorts of shapes and varieties of those in the air and on earth arise; the main example of which some indeed make the conditions connected with the yearly return of the seasons, on which depend the generations of both animals, plants, and fruits—the sun being, so to speak, the begetter.” The *sunaphê* of those natural entities whose connectedness is revealed by their remarkable variety to be of a non-teleological nature . . . is held to consist either in their being the side-effect of phenomena occurring elsewhere in the cosmos . . . or in their being produced by phenomena occupying a higher level in the hierarchy of being, and which thereby impose a constraint on the phenomena occupying a lower position.

It is important to note that van Raalte refers to the view expressed in this passage as Theophrastus' own. By following the method used above in discussing the passage at 9b16–10a21, I shall attempt to show that the attribution of this view to Theophrastus is open to suspicion.

As with the passage discussed earlier, this passage too may be divided into three parts: introduction, thesis, antithesis. The passage quoted by van Raalte is in fact out of context. The complete passage runs from 6b23 to 7b5; the introduction from 6b23 to 7a10; the thesis from 7a10 to a19; and the antithesis from 7a19 to 7b5.

In the introduction the question is raised as to the nature of the ruling principles. Are they indefinite or definite or, correspondingly, material or formal? It will perhaps be important to what follows to note that Theophrastus refers to Plato's view in the *Timaieus* (30A) that if anything should be definite, it should be the ruling principles, “for order and definiteness are most appropriate to the things of highest worth”; and it may be important that he opposes Plato's view to that of those who make the ruling principles “shapeless and as it were merely potential.” He then goes on to say that some make the ruling principles formal, others material, while others both.

In the thesis, Theophrastus criticizes the materialists, or those who make the ruling principles indeterminate. He begins by saying that it would seem unreasonable even to them (*alolon de kakeinois doxeien an*) “if the whole universe [*ei ho men holos ouranos*] and each of its parts all involve order and plan in respect both of shapes and of powers and of periods of time, but in the ruling principles there is nothing of this sort, but ‘the most fair universe,’ as Heraclitus says, ‘is like a rubbish-heap of things thrown anyhow.’ Yet they make the assumption we have named, even (one may say) in the smallest detail,” namely, they maintain that definiteness is pervasive in the whole universe while also maintaining that the ruling principles are indefinite. In other words, I suppose, it does not seem so unreasonable to them after all.

In the antithesis, Theophrastus points out the difficulty involved in holding the opposing view that the *archai* are determinate. For, as he says, the bestowal of rational accounts to each class of things (*to tous logous hekastoio peritheinai*) is not easy. This statement may in fact be read as a mollification of

his criticism of the materialists, as well as a pointing out of the problematic character of the view that the *archai* are determinate. It would seem to be just as difficult to start with determinate principles and fully determine everything else as it would be to start with a fully determinate universe and reach determinate principles. But in the remainder of the antithesis (*plēn-ēliou*) he no longer seems to refer to the *archai*, but only to things “in the air and on the earth.” Here his point seems to be that *perhaps* it is possible to explain all these things, but only in a materialist, mechanist way. The *times* at 7b2 would seem to indicate that Theophrastus is not speaking for himself. Moreover, the critical character of the thesis would also seem to indicate that Theophrastus does not favor a mechanistic hypothesis. For he expected that even the materialists would think it unreasonable to have a completely definite cosmos and at the same time indefinite *archai*, but, as he says, that does not seem to be the case.

As Ross says in his notes on the passage, it may be that Theophrastus would want to hold a middle position between these two opposing views. He does not find either totally attractive. The formalists perhaps make the appropriate (cf. 6b28, *oikeiōtaton*) assignment of definiteness, since they attribute it to the things of highest worth, the *archai*. Yet they have difficulty explaining many things thereby, as stated in the antithesis. The materialists, on the other hand, are in the rather unreasonable position of assigning definiteness to everything except to the things of the highest worth. Yet, their position would seem to gain “some plausibility” *ti piston* when compared to those formalists who hold that certain things have “no explanation,” as Theophrastus says at 10b24–11a1. On this account, Ross’s view, then, would seem to have some plausibility of its own. And since the middle position would here be that of those who recognize both formal and material principles, Theophrastus’ view indeed begins to look Aristotelian.

Our account of this passage then suggests that the antithesis is not Theophrastus’ own view. In fact, of the two possible views expressed there, Theophrastus would seem to be in favor of neither. Thus there would seem to be good reason to doubt van Raalte’s thesis, at least insofar as this particular passage is concerned. Theophrastus may indeed have held a nonteleological world view, but such a view does not seem to be advocated in the above passage. As our account has perhaps shown, van Raalte quotes the antithesis out of context and has not heeded Reale’s warning.⁶

NOTES

1. The quotes in the last two paragraphs are from W.D. Ross and F.H. Fobes, *Theophrastus Metaphysics*, Oxford, 1926, p. xxv.
2. *Ibid.*, p. xix.
3. G. Reale, *The Concept of First Philosophy and the Unity of the “Metaphysics” of Aristotle*,

trans. G.R. Catan, New York, 1979, p. 419–20, no. 41 (there is an obvious misprint—page 5 instead of 7). The other commentator is J. Tricot.

4. See S.C. Pepper, *World Hypotheses*, Berkeley/Los Angeles, 1948, p. 147.
5. Van Raalte's insistence that the organicist view is fundamentally nonteleological requires comment. As far as I understand the issue, the progressive categories of the organicistic world hypothesis do exhibit a tendency towards a goal, viz., an organic whole, as for instance the Absolute in Hegelianism. But when one considers this tendency from the point of view of the ideal categories, it becomes apparent. In fact, the dichotomy of activity/goal is in the end transcended. The fragments which appeared to tend towards integration in the whole turn out to have been there all the time. This idea seems to be expressed by van Raalte in sections I.2 and I.4 of her paper. We may in this way also understand her insistence that teleology implies that the goal is outside or external to the organism, as, say, with a dualistic metaphysics such as Plato's. It is, I believe, somewhat easier to conceive of the transcendence of dichotomy in the case of an apparent immanent finality. Van Raalte seems to agree. See her account, for instance, of the Homer passage in section II.1: "Theophrastus might have gone on to claim that the picture of the Homeric Zeus who is in the world and takes part in its goings-on actually expresses his own conception of the first principle more aptly than Aristotle's."
6. It is perhaps significant that both Ross and Reale translated the beginning of the antithesis as "on the other hand," while van Raalte has "but, again."

Four Notes on Theophrastus' *Metaphysics*

André Laks, Glenn W. Most, Enno Rudolph

This article brings together four papers that have been prepared during our work, together with Charles Larmore, on the forthcoming Budé edition of Theophrastus' *Metaphysics*.¹ Although all four arose out of intensive common discussions of the text, they are to a large degree autonomous and each has a principal author. That author is identified in brackets after each of the four headings.

I. THE RELATIVE DATE OF THEOPHRASTUS' *METAPHYSICS* (G.W. Most)

When did Theophrastus write his *Metaphysics*? The following reflections do not aim to provide a definitive answer to this question, but only to outline tentatively what seems to be a new line of argument that might cast light upon it.²

It is obvious that the character of the treatise makes it most improbable that we shall ever be able to establish a firm connection between some part of it and a secure external date. Therefore, the most promising way to seek an answer to our initial question is to recast it by trying to place this text in relations of priority and posteriority to other philosophical texts. But after all, it is this kind of relative date that is likely to interest us most anyway, since the answer to the question of the exact date of the treatise's composition, even if it could be found, would be of interest mostly to antiquarians, while that regarding its systematic relation to other texts might well be of philosophical interest too.

It is naturally Aristotle who provides the largest and most complex context within which Theophrastus can be located, and hence it is not surprising that scholars who have raised the question of the date of this treatise have attempted to answer it by situating it with regard to Aristotle's writings.

Hitherto, scholarly attention has focused almost exclusively on connecting Theophrastus' *Metaphysics* with Aristotle's *Metaphysics*, and in particular with the discussion of multiple unmoved movers in Lambda 8 of the latter.³ But the results obtained in this way have not been entirely satisfactory: very different relative datings have been proposed, in part because of a lack of widespread agreement about the relative date of Lambda 8 with regard to the rest of Aristotle's *Metaphysics*. It cannot be excluded that future research will uncover convincing temporal relations between these two treatises; but in the meantime, in the absence of a consensus about whether Aristotle's *Metaphysics* does contain strata composed at different times, let alone what, if so, their relative chronology is, it might be better to look first for other Aristotelian contexts in which to place Theophrastus's treatise.

An excellent alternative candidate would seem to be provided by Aristotle's biological writings, which stand in an evidently close relation to the series of teleological aporiae Theophrastus proposes in chapter 9 of his treatise.⁴ What exactly is that relation? Hitherto both discussions of Theophrastus⁵ and more general studies of Greek science⁶ seem to have simply assumed without explicit argument first, that the Aristotelian texts precede the Theophrastean ones, and second, that in this chapter Theophrastus is making a direct criticism of Aristotelian doctrines. This is not impossible, but it should be demonstrated on the basis of an impartial examination of the texts. And it should be remembered that, though we tend to think of Theophrastus primarily as Aristotle's student and successor, he was in fact about fifty when Aristotle died, and that scholars are agreed in dating some of Aristotle's biological writings to the last decade of his life.⁷

Chapter 9 of Theophrastus' *Metaphysics* begins by asserting the difficulty (*ourhaidios* 10a23) of finding explanations in terms of final cause (*heneka tou*) and functionality (*mēden matēn*) that will fit every case (*panth'*). This is, of course, not a rejection of teleological explanation⁸—Theophrastus does not say that it is impossible to find such explanations, but only that it is difficult, nor does he even say that there is no case for which it is easy to find them, but only that it is hard to find them for all cases. He then goes on to give examples of such difficult cases from heavenly (10a27), terrestrial (10a28–b7), zoological (10b7–20), botanical, and mineralogical phenomena (10b21–24). After he suggests that one might well ask what the final cause is in the case of this last class of things (*tinou heneka tauta zētēseien an tis* 10b23–24), rejecting the hypothesis that they might have no explanation whatsoever (*auto gar touto aporon to mē echein logon* 10b24–25), and deeming plausible the alternative hypothesis that these might after all be spontaneous or due to the effects of the rotation of the heavenly spheres (10b26–11a1), Theophrastus returns to the general level of his argument. He asserts that limits should be set to explanations in terms of final cause (*heneka tou* 11a1) and desire for the best (*eis to*

ariston) and that such explanations should not be applied without further qualification (*haplōs* 11a3) in all cases, neither as universal statements nor as explanations of particular phenomena. Here too he draws upon zoology to give two examples of the kind of explanation he finds unsatisfactory. But he concludes that, even if on the one hand there are limits to order and the desire for the better in the universe, on the other, those who think that the universe is for the most part disordered and evil are quite stupid (11a18–26).

Taken together, this section provides ten examples drawn from the realm of zoology. Let us consider them in connection with their possible Aristotelian parallels:

Case 1

“The breasts (*hoi mastoi*) of males” are “as it were (*hōsper*)⁹ useless (*mataia*)” (10b7–8). But Aristotle says that males have fleshy breasts (*hoi mastoi*) for the reason (*dia tēn aitian*) that the parts around the heart need to be covered, and that breasts in females have the additional function of storing nourishment for the offspring (PA 4.10.688a19ff.). Neither here nor elsewhere does Aristotle ask why male breasts have nipples (*thēlē*); but then neither does Theophrastus.

Case 2

So is “the emission (*proesis*) of females, if indeed it does not contribute anything (*eiper mē sumballētai*)” (10b9). What is this emission?

(a) It might be thought that Theophrastus is referring to the alleged production by females during intercourse of semen corresponding to that of males. Aristotle discusses this issue at length in GA 1.19 and concludes emphatically that such a production simply does not occur in females (for example, see 727a25ff.); hence, if this is what Theophrastus is referring to, he is presupposing the existence, and questioning merely the utility, of a phenomenon whose very existence Aristotle unambiguously denies. Aristotle also refers on several occasions to a vaginal discharge that occurs in some women during intercourse and concerning whose function he makes no positive claims, stating simply that it is not seminal (GA 1.20.727b36, cf. 2.4.739a37f.); if it is this that Theophrastus is referring to, he is calling into question a utility about which Aristotle says nothing at all. But against this latter interpretation it may be urged that the balance of this sentence seems to require a reference to an emission as common to all women as breasts are common to all men, while both times that Aristotle discusses this secretion he stresses that it is found only in some women, not in others (GA 1.20.728a1ff., 2.4.739b1).

(b) The emission that best satisfies this last requirement is that of menstrual fluid (cf. for example *tois men hē tou spermatos proesis tais d' hē tōn katamēniōn*, HA 7.5.585a35–36, cf. GA 4.8.776b27–28). If Theophrastus' *proesis* is

referring to the content of the menstrual emission, then he is describing as being “as it were useless, if indeed it does not contribute anything” a physiological phenomenon to which Aristotle’s theory of animals emphatically assigns a critical function. *GA* 1.19 is devoted to showing that, while the mother contributes no seed to her offspring, her menstrual fluid provides the necessary matter without which the form present in the father’s seed cannot create an embryo, and the verb *sumballetai* recurs at least eight times in this connection, usually in prominently placed summary statements.¹⁰

(c) But, considering the form of the word¹¹ and its usage elsewhere,¹² it is likelier that *proesis* here signifies, not the contents of the menstrual fluid, but instead the process of emitting it, so that Theophrastus is probably casting doubt not upon the function of the content of that particular menstrual emission which in Aristotle’s theory goes toward making up the embryo, but rather upon the regular monthly menstrual flow when the mother is not pregnant. But in that case too he is referring to a phenomenon that has a clearly defined function in Aristotle’s biological system. Aristotle shows in *GA* 2.4 that the female’s coldness prevents her from fully concocting her blood, which fills to overflowing the narrow blood vessels of the uterus and results in something like a hemorrhage (738a11ff.). The monthly evacuation of this residue preserves the woman’s health (*ta sōmata sōzousin* a28) by ridding the body of residues that would otherwise cause diseases. That is why Aristotle repeatedly claims that the absence of menstruation in a woman who is not pregnant causes illness (*GA* 2.4.738a28ff., 4.6.775b8–9).¹³

Case 3

So is “the beard in certain animals” (10b10). There seems to be no relevant passage in Aristotle’s extant writings.

Case 4

So is “in general the growth of hair in certain places” (10b10–11). But at *PA* 2.14.658a18ff., Aristotle says that hair has a function, namely that of providing protection (*skēpēs charin*), and he explains in some detail why different parts of the body of different animals have hair or lack it. Along the way he stresses that, when possible, nature protects the nobler parts (*tois timiōterois*), for whenever possible she always causes the better (*aci gar ek tōn endechomenōn aitia tou beltionos estin*, a23–24).

Case 5

So is the size of the horns of deer, which harm them in various ways (10b11–14). While Aristotle thinks that in general the function of horns is for self-defense and attack (*boētheias kai alkēs charin*, *PA* 3.2.662b27), he is convinced that the horns of deer are useless (*achrēstos*, 663a8). He describes

the disadvantages of their horns in language similar to Theophrastus¹⁴ and repeatedly uses them as an example of something that serves no necessary end (*pros mēden tōn anagkaiōn*, PA 3.1.661b36ff.) or that is useless and even dangerous (*chrēsima mē einai*, PA 3.2.664a6ff.). Nature has given each animal only one adequate means of defense: deer are protected by their speed (663a17f.).

Case 6

“The copulation of the heron (*ho erōdios ocheuei*)” is “violent or unnatural” (*biē ē para phusin*)” (10b14–15). Aristotle divides herons (*tōn erōdiōn*) into three species, of which one, the ash-colored variety (*ho pellos*), is characterized by its copulating with difficulty (*chalepōs eunazetai kai ocheuei*). It screams and allegedly emits blood from its eyes while it copulates (*ocheuōn*), and gives birth badly and painfully (HA 9.1.609b23–25, cf. *ocheuei chalepōs* 9.18.616b33f.).

Case 7

So is “the life of the day-fly (*to hēmerobion zēi*)” (10b15). Aristotle nowhere refers to a *hēmerobion*, but he does describe in several passages the *ephēmeron*, which is peculiar (among other reasons) also with regard to its life (*kata ton bion sumbainei to idion*, HA 1.5.490b1–2). It is born from walletlike objects, larger than grapes, carried by the Hypanis river around the summer solstice, and lives only until sunset of a single day (HA 5.19.552b17–23). Most insects, on the other hand, live for a year (*De longaev.* 4.466a2–3).¹⁵

Case 8

“The greatest and best-known example concerns the nourishment and generation of animals: for these are because of nothing, but rather side-effects and due to other necessities. For if they were for the sake of them, they would have to be always unvaried and in the same way” (10b16–20). What is Theophrastus referring to here? The elliptical quality of this passage makes its point extremely obscure. I can suggest three possible interpretations, but there may well be others.

(a) The phrase “always unvaried and in the same way” (*aei kata tauta kai hōsautōs*) seems very Platonic and is particularly reminiscent of the *Phaedo*’s discussion of the Form as the true cause of living things.¹⁶ Theophrastus might be objecting to such a Platonic account that if the Form, the cause of an animal’s nourishment and generation, is “always unvaried and in the same way,” so too we would expect the nourishment and generation themselves to be “always unvaried and in the same way,” that is, taking place incessantly and uniformly. There is what looks like a similar criticism of the *Phaedo* in Aristotle’s *Metaphysics* A.9 (991b3–5).¹⁷ One way to understand this criticism would be in terms of the common observation that these phenomena are

seasonal: if Theophrastus' mention of "side-effects and other necessities" is taken to refer to the effects of the motions of the heavenly spheres, it may point in this direction.

(b) In *GA* 4.10 Aristotle discusses the length of gestation and the times of pregnancy of the various animal species. In his summary at the end of the chapter, he refers to these two phenomena as the internal nourishment and the external generation of animals (*tēs esothern trophēs tōn zōōn kai tēs thuraze geneseōs* 778a10–11). His general point here is that nature strives to determine these processes with reference to the motions of the heavenly bodies, but that her success is limited by various factors such as the indeterminateness of matter and the plurality of principles (cf. especially 778a4–9). Theophrastus might be referring to the same phenomena: if gestation and birth are for the sake of the animals, why do they seem to a certain extent to follow the cosmic cycles?

(c) A third interpretation would locate the problematic variability not within a given species but between one species and another: if what makes animals have nourishment and generation is not the particular kind of animal that they are (their species), but rather the very fact that they are animals (*qua* animals),¹⁸ why do these processes vary from species to species? One might expect them to be unvarying and to be performed in the same way from case to case (taking *aei* in this meaning and not as "incessantly"). In *HA* Aristotle lists at some length the varieties of generation (5–6) and of nourishment (8.2–11) from species to species. His treatise *Peri trophēs*, to which he alludes on several occasions,¹⁹ is not extant, but in *GA* he explains that while the variety of modes of generation of the various animal species seems quite disordered if we classify the species in terms of their manner of locomotion, it forms a regular series if instead we use as a criterion of classification the degree to which the animals are more perfect and share in a purer principle (*GA* 2.1.732b26–33b23).

Now it is not clear which of these three interpretations of Theophrastus' argument, if any, is the correct one. Hence it seems safer to leave this passage out of account for the time being in considering his relation to Aristotle.

Case 9

An example of the kind of unqualified explanation Theophrastus finds unsatisfactory is "the windpipe is in front of the gullet, for that is the more honorable position" (11a10–11). At *HA* 1.16.495a20ff. Aristotle mentions the fact that the windpipe is in front of the gullet, and at *PA* 3.3.665a7–26 he explains why this is the case, even though the reverse position would have made it impossible for food to go down the windpipe and thereby would have obviated the need for an epiglottis. His explanation does not take the form of the unqualified axiological assertion that the windpipe is in front because that

is the more honorable position; instead, Aristotle's explanation is emphatically oriented toward claiming that the windpipe's location is determined by necessity (*ex anagkēs* 665a10, *anagkaion* a19, 20), for it leads to the lungs and heart, which are located at the front of the organism. Why then is the heart located in the front? Because, says Aristotle, it is the principle of life and of all movement and sensation, and these latter two activities are directed forward (665a10–15, cf. *Juv.* 1.467b30–32, *De inc. anim.* 4.705b10ff.). The result, to be sure, has an axiological aspect as well: where possible, what is more honorable tends to be above, in front, and on the right (665a22–26), and we may add that this is indeed the case with the heart (except that, in man, it is on the left) and windpipe. But Aristotle's explanation for the location of the windpipe is not at all the kind of unqualified axiological assertion Theophrastus seems to be criticizing.

Case 10

Another example of an explanation Theophrastus is not satisfied with is “the blood-mix in the central chamber of the heart is the best (*aristēn*), for the center is the most honorable position” (11a11–12). Aristotle speaks of different kinds of blood-mix (*PA* 2.4.650b29, 4.10.686a9),²⁰ and describes the central chamber of the heart (*HA* 1.17.496a20f., *PA* 3.4.666b21ff.), but he nowhere asserts that the blood-mix in that chamber is the best, either of the blood in the heart or of all the blood in the body. He does say in one passage that it is thinner (*leptōtaton*) than that in the other two chambers (*HA* 1.17.496b10) and in another that it is purer (*katharōtaton*), and intermediate in heat and in quantity (*PA* 3.4.667a3–4); but these are descriptive terms, not normative ones, and indicate merely that this blood contains a higher proportion of the water element and a lower one of the earth element (cf. *PA* 2.4.650b20ff.).²¹ At *HA* 3.19.520b21f. he says that the best blood (*to beltiston*) is neither too thick nor too thin, but there is no apparent connection between this claim and any views about the blood in the central chamber of the heart. A large step seems to separate any of these passages from the assertion that the blood in the central chamber of the heart is the best, and Aristotle seems not to have taken that step.

Setting aside cases 3 and 10 as ones in which there is no close Aristotelian parallel, and case 8 because its interpretation is so uncertain, we can classify the remaining seven cases into three groups:

Group A: Theophrastus asserts the difficulty of finding a teleological explanation for phenomena to which Aristotle's biology ascribes a precise function (cases 1, 2, 4).²²

Group B: Theophrastus asserts the difficulty of finding a teleological explanation for phenomena that Aristotle's biology either explicitly calls useless

(case 5) or discusses in terms that make it clear that Aristotle too would agree that they seem to be violent or against nature (cases 6, 7).²³

Group C: Theophrastus criticizes an explanation which is not that furnished by Aristotle for the phenomenon in question (case 9).²⁴

Can these cases only be understood on the assumption that Theophrastus is using them to criticize Aristotle's teleological biology? This seems to be the scholarly consensus, but I see nothing in any of them (let alone in all of them) that could only be explained by this hypothesis. What is more, at least four objections can be made against such a view:

- I. If Theophrastus is criticizing Aristotle, his criticism in the cases of group A is taking the form of a peremptory dismissal of Aristotelian explanations without any justification or counter-evidence being offered to indicate why those explanations are being considered unsatisfactory. Theophrastus does not consider Aristotle's explanations and rejects them for reasons he states. He speaks as though he were either unaware of those explanations or thought them unworthy of serious discussion.²⁵ Not only might we judge this rude on Theophrastus' part, but it also is strongly at variance with the rest of the *Metaphysics*, where rival theories are never simply rejected without a reason being offered for doing so.
- II. If Theophrastus is criticizing Aristotle, why does he fail to distinguish between those cases in which he disagrees with Aristotle (group A) and those in which he agrees with him (group B)? He would be using the evidence provided by Aristotle himself against Aristotle's own views, yet he would not be indicating that Aristotle too had drawn from some of that same evidence the same conclusions that Theophrastus drew. In what sense, therefore, can we say that, in the cases of group B, Theophrastus is criticizing Aristotle? And for that matter, why does Theophrastus not distinguish between those cases which Aristotle discussed and those he did not (cases 3, 10)?
- III. Lennox has suggested that Theophrastus' criticisms are directed against a "panglossian" teleological view of Aristotle's, according to which all biological phenomena admit of a teleological explanation.²⁶ If this were true, it might help us to deal with some of the difficulties I have just listed (II above): it might then not matter whether Aristotle himself had discussed the phenomenon in question, or had described it as useless. In either case, Theophrastus might have justifiably cited it as counter-evidence to such a "panglossian" view. But Lennox's argument is open to a fatal objection: Aristotle in fact did not subscribe to a "panglossian" teleology.²⁷ For him, the final cause does not operate always and without exception, but instead merely "always or for the most part," and only when it is not blocked by other factors. Therefore, for example, Aristotle can explicitly and without embarrassment devote the whole of the last book of *GA* to discussing phenomena in which the final cause is not operative (cf. especially *GA*

5.1.778a30–778b1). If Theophrastus' criticism is of this sort, then Theophrastus, who worked closely with Aristotle for decades and was chosen by him as his successor, has misunderstood Aristotle on a fundamental and clearly stated point of his philosophy.

- IV. Finally, when Theophrastus refers to the emission of females, he says that it is as it were useless, "if indeed it does not contribute anything (*eiper mē sumballetai*)" (10b9). Not only does Theophrastus take no account here of what is either a central (case 2[b] above) or at least an important (case 2[c]) Aristotelian view. What is more, the strongly dubitative force of *eiper*²⁸ is incomprehensible unless Theophrastus can presuppose that his audience will agree that no explanation of the function of female emission is available. Theophrastus must be referring to a view, perhaps a widespread one, that the emission does not contribute anything,²⁹ and he is perhaps hinting at some doubt about that view's correctness. If he or his audience had known of a functional explanation of that emission's contribution, not only might he well have been expected to discuss it, if only to demonstrate its shortcomings, but also, and more strikingly, he could hardly have meaningfully said, "if indeed it does not contribute anything."

These considerations would seem to pose serious difficulties for the widely held belief that Theophrastus in his *Metaphysics* 9 is criticizing Aristotle's views. Might Theophrastus still have been writing after Aristotle, but not have been directly criticizing him?

1. Might he be writing in ignorance of Aristotle's views? In view of the decades of close collaboration between the two, we may surely dismiss at once the suggestion that we might know more about such aspects of Aristotle's philosophy than Theophrastus did. Furthermore, some of the parallels (especially case 5, cf. also cases 6 and 7) are so close that it is difficult not to see some sort of connection between them.
2. Might he be simply sketching out doubtful cases for their own sake, so that, though he knew that Aristotle had held views on this subject, that would be a matter of indifference to him here? But it would seem strange indeed for Theophrastus, in chapter 2 of his *Metaphysics*, to have devoted such close attention to the specific difficulties raised by Aristotle's doctrine of the unmoved mover and, in chapter 9 of the same treatise, to have been indifferent to the fact that Aristotle had discussed precisely these issues.

But both of these last two suggestions have the air of desperate remedies and should only be adopted as a last resort, not least because they would make it impossible to establish any systematic relation between these two sets of texts.

The most attractive alternative would seem to be the suggestion that this chapter of Theophrastus' *Metaphysics*, and with it the rest of the treatise (for it

seems impossible to separate this chapter from its context, and no one has ever suggested doing so) was written, not after, but *before* Aristotle's *PA* and *GA*. This might well mean that the difficulties raised by Theophrastus were designed not to block a line of reasoning (that is, Aristotelian teleology), but instead to encourage research by pointing toward problems that required explanation. If so, then the explanations provided by Aristotle in *PA* and *GA*, so far from being the object of Theophrastus' criticisms, were instead answers Aristotle provided to the kinds of questions Theophrastus raised. After all, Theophrastus concludes his *Metaphysics* with a call for further work on these subjects (*Alla dē toutōn men peri skepteon* 11b24) and describes the questions he has raised as the *beginning* of investigation of the universe (*hautē gar arkhē tēs tou sumpantos theōrias* 11b27–12a1).³⁰ It is thoroughly Aristotelian to regard philosophical and scientific inquiry as beginning with *aporia* and concluding with *euporia*.³¹ There is nothing against the view, and much in its support, that Theophrastus' *Metaphysics* was written around the time of Aristotle's *HA* (upon whose evidence it draws) and before *PA* and *GA* (for which it might be seen as providing a kind of research program)—most likely, sometime in the 330's.

If this argument is accepted, it may well turn out to have interesting consequences not only for the date of Theophrastus' *Metaphysics*, but also for the interpretation of the rest of the treatise, and more generally for such issues as the relation of Theophrastus to Aristotle, the organization of research in the Lyceum, and the Peripatetic use of *aporiae*, as well as for certain systematic aspects of Aristotle's own philosophy.

II. *ENERGELA* IN ARISTOTLE AND THEOPHRASTUS (E. Rudolph)³²

I

One of the fundamental concepts of Aristotle's physics and metaphysics, that of *energeia*, plays a central role as a category in Theophrastus' metaphysical treatise. Theophrastus appears to use this concept—as is well known, the word is an Aristotelian coinage—with a full awareness of the differentiations in it that can be found in the various contexts of Aristotle's philosophy. If so, this would mean that Theophrastus refers not only to Aristotle's early doctrines³³ but also to his mature ones, and in a particularly pertinent way.³⁴

Of special significance for what characterizes Theophrastus' understanding of the concept of *energeia* is his line of argument at 7b10ff. Here Theophrastus discusses the problem of the principles' condition, thereby taking up again the problem of rest which he had already mentioned at 5a24. His decision to reject *ēremia* as the principles' characteristic condition is thoroughly Aristote-

lian. For rest is a lack (*scil.* of motion, cf. Arist. *Phys.* Theta 251a26, and also 226b15 and *passim*).

Hence *all' eiper* (7b13) suggests that, if the alternative *kinēsis-ēremia* is presupposed, a condition that is closer to motion than to rest is to be preferred. But this cannot be *kinēsis* for two reasons immediately connected with one another:

1. *Energeia* is *timiōtera* and *protera* in comparison to *kinēsis*.
2. *Kinēsis* is the distinguishing condition of the sensible world (7b14f.).

We may understand Theophrastus' use of the concept of *energeia* in this connection as being thoroughly Aristotelian in terms of the latter's doctrine of *energeia* as it is elaborated in *Metaphysics* Zeta-Theta as well as in Lambda. It may be added that Theophrastus' sudden switch from the plural *archais* (7b9) to the singular *to kinoun* (7b16f.) and his doctrine of rest as a privation of motion are in accord with the corresponding theses of *Physics* Theta: at 258b11ff., Aristotle considers the question of whether there is one first mover or more than one, and he finally decides in favor of the principle's unity (259a14).

The decisive text for a comparison between the metaphysical significance of Aristotle's concept of *energeia* and Theophrastus' is naturally to be found in *Metaphysics* Lambda. The early dating of this book is now controversial, though it was not for a long time.³⁵ As is well known, Aristotle's decisive argument here is that the first mover must be *energeia* with respect to its essence (*ousia*), since the alternative, namely *dunamis*, would include the possibility of *mē einai* (1071b18ff., cf. 5a7f., where *energeia* and *ousia* seem to be used synonymously).

The rejection of any *dunamis* character for the first mover *eo ipso* precludes the possibility that the first mover itself be in motion. For everything in motion differs from itself with respect to possibility from moment to moment. Change, hence the succession from a condition of "not yet" to one of "now" or "no longer," is the essential characteristic of motion. This belongs essentially to the *aisthēta*. Theophrastus' privileging of *energeia* as worthier and preeminent in comparison to *kinēsis* accords well with the Aristotelian doctrine of the first mover: both Theophrastus and Aristotle argue in terms of the faultlessness of *energeia* in comparison to *kinēsis*. Aristotle does this in contrast to the concept of *dunamis*, Theophrastus in comparison to *kinēsis* or *ēremia*. Both privilege *energeia* with respect to *kinēsis* in this sense. *Energeia* appears precisely as a special or ideal case of *kinēsis*, a suprasensible *kinēsis*, that is, one that is without pause.

II

This observation is supported by the way in which Aristotle works out a definition of *energeia* in explicit contrast to *kinēsis* in *Metaphysics* Theta 6

(1048a18ff.). Aristotle evidently presupposes for the understanding of *Metaphysics* Lambda that the first mover must be *energeia* in respect to its essence. But without this definition, it is not plausible why this should be so. According to this passage in Theta, *energeia* and *kinēsis* differ in their relation to the *telos* of the activity or of the motion. *Kinēsis* has its goal outside itself, while *energeia*—also called *praxis* in this context—has its within itself. It is this text that supplies the premise which makes it possible to understand *energeia* as a kind of completed *kinēsis* and to use it in this sense as an appropriate description for the mode of being of a principle that is itself unmoved but that causes motion. In distinguishing *energeia* as worthier and superior, Theophrastus may have taken over this doctrine and be sharing the twofold Aristotelian aporia connected with it. For on the one hand *energeia*—understood as a kind of completed *kinēsis*—is itself not absolutely opposed to the domain of the kinetic, that is, of the sensibles, but it is instead connected with it in the sense of the *teleological relation* between uncompleted and completed conditions. But on the other hand, the difference between the *prōta* and the sensibles corresponds to that between *energeia* and *kinēsis*. With his initial demand for a *sunaphē*, Theophrastus has basically made this aporia his theme, and he thereby establishes a connection with Aristotle's differentiated formulation of the problem, as transmitted in the *Metaphysics* and in the *Physics*' discussion of the concept of *energeia*.

In Aristotle's *Physics*, and in particular in Book Gamma, which provides the fundamental definitions of *kinēsis*, the concept of *energeia* is not understood in contrast to motion, but instead forms the decisive element in the definition of *kinēsis*: *hē te kinēsis energeia men einai tis dokei* (201b31). But what is decisive for this significant definition is the concluding remark: *atelēs de* (32). If this definition is read together with the characterization of the difference between *energeia* and *kinēsis* in *Metaph.* 1048b18ff., the result is not a contradiction, but rather a reciprocal confirmation and supplementation: *kinēsis* is uncompleted *energeia*; *energeia* is completed *kinēsis*, that is, a *kinēsis* in which the goal for the sake of which the process takes place is already present, but that does not thereby make rest acceptable as an appropriate description of the condition.

This evaluation fits with the other ontological meanings of the concept of *energeia*, according to which *energeiai onta* are described as *pragmata* insofar as they are in fact present (*huparchein*, 1048a31ff.). They refer back to possibility as a mode of their nonpresence whose (threatening) possibility is annulled by their becoming real. Aristotle's examples, for example, the builder (*oikodōmōn*), are intended to demonstrate that *energeia* is characterized by the presence of the process' subject in unity with the process, and not by the process itself, for that would be *kinēsis*. But the subject of an accomplishment in unity with the accomplishment itself is precisely and above all the first mover as the cause of the world process, as described in *Metaphysics* Lambda. Theophrastus' subsequent discussion of the aporia of the principles' imitation

with regard to the question of their rest or nonrest (7b23ff.) could be explained on the basis of the conviction, shared by both Aristotle and Theophrastus, that the first mover is not at rest but is instead *energeia*. Then there would not be any contradiction with regard to imitation at all; with respect to their origin, all things (in Aristotelian terms, *pragmata*) are to be referred back to *energeia*, since *energeia* is prior and superior to *kinēsis* in every regard (1049b4ff.). All things imitate divine *energeia*: the imitation relation is valid.

III

The difference between *hulē* and *morphē* discussed at 8a8ff. continues the discussion of the concept of *energeia*. The parallel established between *hulē-morphē* and *dunamis-energeia* should be regarded as being just as genuinely Aristotelian as is that between *dunamis-energeia* and *on-mē on* (8a10; cf. *Metaph.* Gamma 3.1005bff.). In context, however, Theophrastus makes an objection against a fundamental Aristotelian aporia connected with this parallel: The transition from not-(yet)-being to being is understood—entirely in the sense of Aristotelian teleology and in terms of the common Aristotelian analogy to examples from the domain of artifacts—as a transition to the better (8a14f.). Yet Aristotle's doctrine in the context of the passage from the *Metaphysics* cited above is that it belongs to the essence of *dunamis* to imply not-being: for the same thing can be both itself and its contrary, without contradicting the principle of noncontradiction, by *dunamei*. But in respect to entelechy, this is excluded (1009a22ff.). Aristotle's formulation is pointed: *to gar on legatai dichōs* (*ibid.*).

Theophrastus' text can be read as a commentary on this Aristotelian thesis. On the one hand the transition from *dunamis* to *energeia* is supposed to be a transition from the less good to the better. But on the other hand, it describes a possible transition from being to not-being, more precisely, from *dunamei on* to (*energeiai*) *mē on*, such as in the case of the annihilation or destruction of a being (*phthora*). When at the end of this passage (8b1ff.) Theophrastus discusses the "paradox" that being is not without contraries, he need not be thinking of the Atomists' doctrines.³⁶ *The Aristotelian doctrine of "to on legetai dichōs" is itself paradoxical and Theophrastus might well be putting it into question here with genuinely teleological arguments*, for what is with respect to possibility can just as well not be. If not-being in fact takes place, the result is a transition from a being's being to its non-being. But this is hard to reconcile with an optimistic teleology. The passage in *Metaph.* Gamma also contains a particular argument to which Theophrastus also might be referring: in the *dichōs* passage, Aristotle works not with the conceptual pair *dunamis-energeia*, but with *dunamis-entelecheia*. This is based upon a differentiation of the concept of entelechy which goes beyond that in the *Physics*. Book Gamma of the *Physics* in

particular works with a kinetic concept of entelechy, the *Metaphysics* with an ontological one. The kinetic version conceives of entelechy as the structure of an uncompleted condition, namely of *kinēsis*. That is definitive. The ontological version conceives of entelechy as the structure of a completed condition (so for example clearly at *Metaph.* Lambda 8.1074a36). Aristotle is evidently presupposing this latter concept when at *Metaph.* 1009a36f. (!) he demands an *ousia* in which there is neither *kinēsis* nor *genesis* nor *phthora*, one that is therefore eternal and not kinetic. That is the first mover itself, in which entelechy and activity coincide. The first mover is without *dunamis* and thereby without not-being. In a teleologically structured universe—this is *in nuce* Theophrastus' question—how can there be the goal, the *telos*, without not-being, if things for the most part are characterized by that ontological paradox that is expressed in Aristotle's *dichōs*? This question seems to be the starting point of Theophrastus' teleological skepticism.

III. EURYTUS IN THEOPHRASTUS' *METAPHYSICS* (A. Laks)³⁷

In Theophrastus' metaphysical treatise, the reconstruction (4a17–5a13) and then the critique (5a14–6a15) of the Aristotelian doctrine of the first mover as the unmoved object of desire are worked out on the basis of a previous decision (4a9–17) which supplies the study of the first realities (*ta prōta*, 4a3) with its “starting point” (*archē*, 4a9): there must exist a certain “junction” or “connection” between the principles (the intelligibles) and what depends upon them (the sensibles). Aristotle never uses the substantive *sunaphē* or the verb *sunaptein* in this context.³⁸ On the other hand, the term “episodic” (*epeisodiōdes*), which Theophrastus uses to characterize the alternative rejected as less plausible—that of a “disarticulated” or “disjointed” world—refers in Aristotle to the doctrine of Speusippus.³⁹ *Metaphysics* N.3.1090b19f. explains the metaphor: “But the phenomena show that nature is not a series of episodes, like a bad tragedy.”⁴⁰ In the universe of Speusippus, such as Aristotle perceives it, the different levels of ontological reality, founded on principles specific to each level, remain exterior to one another, with no more bond than a story whose parts follow one another “without probability or necessity.”⁴¹

Book Lambda of the *Metaphysics* closes with a condemnation of “episodism.”⁴² Thus Theophrastus starts off from the point at which Aristotle's treatise on the first mover had arrived.⁴³ It is understandable that the disciple should have been interested in the question of what exactly the “connection” consisted of that Aristotle argued for in other terms when he criticized the disarticulation of the world. In different forms, the theme of “connection” recurs throughout the treatise, even if the term *sunaphē* is no longer used.⁴⁴ In particular, it determines the horizon of the question introduced in 6a15 at the

end of the series of objections relating to the doctrine of desire. This is the translation Ross gives of the beginning of this chapter,⁴⁵ including a transcription of the phrase we will be focusing on:

But at any rate, starting from this first principle or these first principles, one might demand (and presumably also from any other first principles that may be assumed) that they go straight on to give an account of the successive derivatives, and not proceed to a certain point and then stop; for this is the part of a competent and sensible man, to do what Archytas once said Eurytus did as he arranged certain pebbles; he said (according to Archytas) that this is in fact the number of man, and this of horse, and this of something else. But now most people go to a certain point and then stop, as those do also who set up the One and the indefinite dyad; for after generating numbers and planes and solids they leave out almost everything else, except to the extent of just touching on them and making this much, and only this much, plain, that some things proceed from the indefinite dyad, e.g. place, the void, and the infinite, and others from the numbers and the One, e.g. soul and certain other things; and they generate simultaneously time and the heavens and several other things, but of the heavens and the remaining things in the universe they make no further mention (. . . 6a27 *tosouto monon dêlountes, hoti ta men apo tēs aoristou duados, hoion topos kai kenon kai apeiron, ta d' apo tōn arithmōn kai tou henos, hoion psuchē kai all' atta chronon d' hama kai ouranon kai hetera dē pleiō, tou d' ouranou peri kai tōn loipōn oudemian eti poiountai mneian*); and similarly the school of Speusippus does not do so, nor does any of the other philosophers except Xenocrates.

Ought the principles to make possible a full explanation of reality? Theophrastus illustrates the question, to which he seems at first inclined to give a positive answer,⁴⁶ by contrasting on the one hand the ancient wisdom of the Pythagorean Eurytus, who, starting from his own principles, descended as far as man and horse—two examples destined to have a long career⁴⁷—and on the other the dominant (if not exclusive) practice of his contemporaries (*nun de hoi ge polloi*).⁴⁸ Thus a series of doxographic notices takes the place of a diaporematic elaboration. This is a procedure without parallel in the rest of the treatise: one can see here the effect of the central role which, at the very moment when Theophrastus undertakes to examine critically a certain number of specifically Aristotelian theses, the Academic models against which these had in fact been constructed play for him.⁴⁹ By the same token, the chapter is quite informative. It presents, at the end of the anonymous summary and of the mention of Speusippus, an important notice on the structure of Xenocrates' ousiology. It then goes on to give one of the rare surviving testimonia concerning Hestiaeus, a summary of the Platonic doctrine of the Ideas, and finally an allusion, brief but significant, to an anonymous position which, more radical even than the incomplete systems to which the beginning of the doxography is dedicated (in contrast to the "exceptions" represented by Xenocrates, Plato or even Hestiaeus), situates the truth exclusively in the domain of the principles.⁵⁰

The primary difficulty in understanding the end of the extract reproduced above regards the phrase *chronon d' hama kai ouranon kai hetera dē pleiō* (6b2f.), transmitted by all the manuscripts (and the Arabic translation) with the exception of J. This difficulty is double. Grammatically, these accusatives are governed by no expressed verb. As for the content, it seems to be either formally contradicted by the following sentence, *tou d' ouranou peri kai tōn loipōn oudemian eti poiountai mneian*, or else redundant: if one inserts the series "time-heaven-other things" syntactically into the preceding sentence, placing its terms (which would depend upon a verb meaning "to generate") on the same level as *psuchē*, how could the same theoreticians at the same time possibly have derived heaven from their principles and not made any mention of heaven? On the other hand, if one supplies a verb with a negative meaning, like "neglect," the phrase is otiose. In both cases, the athetesis of the words in the accusative seems to resolve both the problem of the construction and that of the meaning:⁵¹ the proponents of the One and of the Dyad may well have mentioned place, the void, and the unlimited, assigning them to the Dyad, and the soul, together with other realities of this type, referring them to the One and to the Numbers. But as for heaven, they said nothing more about it. On the basis of a text emended in this way, Xenocrates, whose completeness Theophrastus opposes to the minimalist tendencies of the majority of Academicians (and of Speusippus), would be distinguished by his giving an account "of heaven and the rest."⁵²

This interpretation is not without its difficulties. The disarticulation of the Speusippean universe may well imply the lack of a "genesis" of an ousiological stratum on the basis of the principles, but nothing prevents this stratum from itself being "mentioned." And if "heaven and the rest" fall within the class of sensibles, as there is every reason to suppose, Theophrastus would have no reason to contrast Speusippus with Xenocrates: the testimony of Aristotle at *Metaphysics* N.3.1090b16–20 authorizes the conclusion that for Speusippus a fourth class of *ousia*, after numbers, magnitudes, and soul, was constituted precisely by "sensible bodies."⁵³ It might well seem strange that a doctrine in which place, the void, and soul play important roles would have neglected heaven (and with it time), and this not in the weak sense in which it is said of the proponents of the One and of the Dyad that they merely "touched" upon the subject (*ephaptomenoi*, 6a27), but in the strong sense in which they would absolutely not have spoken about it at all (by referring them in one way or another to the series governed by the One and the Dyad). The mention of time and of heaven along with soul is rendered all the more plausible by the connections established in the *Timaeus* between the birth of the soul and that of heaven on the one hand (34b), and between the birth of heaven and that of time on the other (37d–38b). Hence it is tempting to suppose that a series including time and heaven after soul must refer to the *Timaeus* or at least

display its underlying conceptual structure,⁵⁴ in virtue of an exegetical operation which certainly engaged others besides Xenocrates.⁵⁵ We may add to these basic considerations the fact that the hypothesis of a marginal gloss (moreover a truncated one) is never anything more than a desperate solution.⁵⁶ Is it not preferable, under these circumstances, to try to preserve this suspect group of words after all?

It could be argued against such an attempt that the existence of a systematic relation between soul, heaven, and time, derived from the *Timaeus*, is not enough to justify the mention *expressis verbis* of *chronos* and *ouranos* in the anonymous doxography. Indeed, *psuchē* (6b2) is followed by an indefinite group *all' atta*: should not time and heaven be counted among "these other things"? In this case, an interpolator might precisely have wished to make matters clearer. If so, without denying the doctrinal pertinence of a triad formed by soul, heaven, and time, one could maintain that the two last terms need not have figured in Theophrastus' original text.⁵⁷

However, this hypothesis is less plausible than it might seem at first glance. For it implies that heaven, time, and the series of realities of which they are representative, should, like soul, be ordered with reference to Numbers and the One. But an exclusive subsumption of heaven and time under the category of limit, within the framework of a doctrine that refers place to the Dyad, would be somewhat surprising.⁵⁸ Soul, time, and heaven, the simultaneity of whose birth leads to their association in the *Timaeus*, do not necessarily have an identical ontological structure, and the systematizing perspective that is at work in the anonymous résumé (whether one refers it to Plato or to the first generation of his disciples) presupposes precisely that the logic of the *Timaeus*, which is that of a narrative, with a temporal sequence of births, not be reduced to a classification obeying other (systematic) organizational criteria.⁵⁹ Hence it is probable that *all' atta* refers to terms that are structurally related to the soul, as are void and the infinite in the case of place, and that can be referred to the Numbers and to the One just as the first group of terms is referred to the Dyad. If so, time, heaven, and the realities associated with them might well constitute mixed terms, in which the order of the limit is combined with that of the unlimited.⁶⁰ A further argument in favor of the relative independence of the group of "soul and other things of this sort" on the one hand and that of "time, heaven, and many other things" on the other can be derived from the fact that the formulation *hetera dē pleiō* seems to encompass a larger number of entities. In short, the arguments in favor of keeping the phrase in the accusative remain valid. But what is to be done with the objections that provoked its athetesis?

The grammatical objection is not compelling. In a treatise whose style is often rather rough, the ellipse of a verb called for by the meaning is perfectly acceptable. In the sentence following Theophrastus' doxography (*peiratai de*

kai Hestiaios mechri tinos, ouch hōsper eirētai peri tōn prōtōn monon, 6b9–11), one must supply first a *proelthein*, called for by *mechri tinos*, by reference to the first lines of the chapter (6a18), then, this time without any textual support, a main verb of a declarative meaning (to speak of, to discuss) to which the preposition *peri* can be attached.⁶¹ Something like this could be the case in the phrase we are discussing, and in fact this is the solution proposed by the two principal defenders of the transmitted text, Ross and Isnardi Parente.

Yet these two scholars disagree on the question of deciding which phrase to attach these words to: the former prints a period after *atta* and supplies a *gennōsi* on the basis of the *gennēsantes* in a25; the latter suggests punctuating with a period after *pleiō* and printing a comma after *atta*, so as to associate time and heaven more closely to soul than Ross's punctuation permits (such at least is her view), and supplying the participle *gennēsantes* itself.⁶² Against this latter construction, however, several objections must be made: (1) Such an anacoluthon, with a shift from the nominative into the accusative, within the same sentence, of a series of substantives that are supposed to be attached semantically as closely as possible to one another, would be intolerably rough. (2) Furthermore, Ross's punctuation does not imply that the group *chronon . . . pleiō* constitutes a simple parenthetical reference to the *Timaeus*: on the contrary, as we shall see in a moment, it is the whole notice, including the phrase *tou d' ouranou . . . mneian*, which Ross refers to Plato's cosmology. (3) Serious doctrinal difficulties are raised by an immediate attachment of *chronon* etc. to *psuchē*.⁶³

But does not Ross's punctuation make the contradiction with the following phrase glaringly obvious? To reconcile mentioning the genesis of heaven with maintaining silence in regard to it, Ross makes a distinction between two ways of dealing with it: "though Plato describes the generation of the heaven, he does not go on to explain from his first principles the observed facts about its movement or those of the various celestial spheres, nor the concrete nature of the soul and of the other things he has derived from his first principles."⁶⁴ This explanation betrays some embarrassment and does not really correspond to the text: not making any mention of the heaven is not the same thing as not going into the details of its organization. In fact, the exclusive reference to the *Timaeus*, introduced to justify the presence of time and of the heaven ("at the same time as the soul"), is more of a hindrance than a help when it is mobilized to explain *tou d' ouranou peri kai tōn loipōn*. Ross himself could have done without it.

To avoid the contradiction it might be thought sufficient to take *eti* (with Ross) not in a logical sense ("they discuss *x* and *y*, but no longer *z*") but in a temporal one ("they discuss *a* on this occasion, but then no longer"). Theophrastus would then be asserting in a general way, and without special reference to the *Timaeus* (this does not exclude an indirect reference of an

exegetical nature), that, even though they included heaven etc. among the realities they generated on the basis of the principles, the proponents of the One and of the Dyad later became entirely disinterested in them (that is, they did not develop any cosmology). But this simplified version of Ross's interpretation runs into an objection: locally plausible, it fits badly into the general context of this doxography. For the question here is not whether these philosophers developed a cosmology, a biology, or a history of plants. They could perfectly well have done so without having been able to refer the different domains of reality to the principles. But this is the very point that is the object of the chapter.⁶⁵ Rather than supposing that Theophrastus has failed to distinguish the two aspects of the problem and that, swept along by the movement of his own critique, he has passed surreptitiously from a metaphysical question relating to the derivation of beings to that of their treatment within the framework of a particular science, we will prefer to adopt the "logical" meaning of *ouch eti*. In fact, in this context the expression "no longer make mention of" more naturally evokes the omission of a term belonging to a series than a lack of the sort presupposed by Ross' interpretation (original or alleged). Apparently, then, the question is one of finding a *z* of which it would be said that the proponents of the doctrine summarized no longer make mention of it and which would be distinct both from *x* and from *y*: in effect, only the temporal meaning of *eti* would have permitted the identity of a single term *a* to be preserved.

If the interpreters' attention has been focused upon the group *chronon . . . pleiō*, this was because its construction is difficult and hence it has been thought that the sense of the phrase could only be restored by emending it. But suppose the fault lies not there, but in fact rather in the words *tou d' ouranou peri kai tōn loipōn*, and more specifically, since *loipōn* causes no trouble, in *ouranou*. Now there is at least one series of realities, besides soul, heaven, and time, which the proponents of the One and of the Dyad might well not have referred to their principles: precisely those down to which Eurytus had continued without stopping half-way, the natural species exemplarily represented by man and horse. In that case, why not substitute *anthrōpou* for *ouranou*, so that "the rest" no longer refers, according to the traditional interpretation, to time etc., but instead to horse and (for example) to plants?⁶⁶ The confusion of the two terms, due to abbreviation, is a classic error. An example in this same treatise of Theophrastus' is found at 5b20: where one part of the tradition reads *anthrōpou*, *ouranou* must be read with the other manuscripts.⁶⁷ In this hypothesis, what is done by neither the majority of Academicians nor by Speusippus is to bridge the gap between the principles and the species: thereby they disavow Eurytus, a representative of the Pythagorean school, which both parties perhaps claimed for themselves.⁶⁸

Is it then the case that Xenocrates, Hestiaeus, and Plato were more

successful in *this* regard, so that Theophrastus could contrast them in differing degrees with the majority? Our knowledge of Hestiaeus is too scanty to permit us to say anything at all on this subject. And to explain the meaning of the contrast Theophrastus draws between Xenocrates and Speusippus would require not only an interpretation of fr. 26 Heinze (= 100 Isnardi Parente)⁶⁹ but also a detailed discussion of a certain number of classic problems relating to the reconstruction of Academic doctrines. We shall limit ourselves here to outlining a hypothesis on the basis of the notice concerning Plato. The founder of the Academy is presented (though in a problematic mode: *doxeieian*, 6b12) as being, like Xenocrates (and to a certain extent like Hestiaeus), concerned with other things besides the first realities. By "connecting" (*anaptōn*) the sensibles to the Ideas, these to the Numbers, and by passing from these latter to the principles before proceeding to his genetic deduction, Plato gave himself the means of establishing a connection between the sensible individuals and the principles by the mediation of the Ideas. The Form of man is famous for the third man to which it gives rise. It is associated with the Form of horse in a passage in Book Zeta of the *Metaphysics* directed against the proponents of the Ideas: not knowing what the true imperishable *ousiai* are, "they make them the same in kind as the perishable things . . . man itself (*autoanthrōpos*) and the horse itself (*autohippos*), adding to the sensible things the word 'itself' " (Z.16.1040a30–34). Even better, the parallel passage at M.8.1084a12–14—the only other occurrence in Aristotle of the pair *autoanthrōpos-autohippos*—is also a critique of the doctrine of the Idea-Numbers.⁷⁰ It may be suggested that it was Xenocrates' very fidelity to the Platonic theory of Ideas that could make him pass, among Theophrastus' contemporaries, for the only legitimate heir of the wisdom of Eurytus.⁷¹

IV. HERACLITUS, D-K 22 B 124 IN THEOPHRASTUS' *METAPHYSICS* (G.W. Most)

ἄλογον δὲ κάκεινοις δόξειεν ἄν, 10
εἰ ὁ μὲν ὅλος οὐρανὸς καὶ ἕκαστα τῶν μερῶν
ἅπαντ' ἐν τάξει καὶ λόγῳ καὶ μορφαῖς καὶ δυνά- 12
μεσιν καὶ περιόδοις, ἐν δὲ ταῖς ἀρχαῖς μηθεὶ
τοιούτου ἄλλ' "ὥσπερ σάρμα εἰκῇ κεχυμένων ὁ 14
κάλλιστος," φησὶν Ἡράκλειτος, "[ὁ] κόσμος."

- 14 σάρμα corr. Diels : σάρξ codd.: σάρκον ci.
 Bernays : σωρὸς ci. Usener κεχυμένον Usener
 15 ὁ del. Usener

For this sentence, the manuscripts offer few and insignificant divergent readings,⁷² but this has not stopped modern scholars from disagreeing considerably on how it should be printed. At line 10, Bergk's *kakeino* is quite implausible:⁷³ an additive *kai* ("this too") would result in the impossibility of Theophrastus' characterizing as "absurd" not only the (materialist) position described in this sentence, but also retrospectively the (mixed) view of the previous sentence (namely that the principles should be both formal and material, since complete reality seems to be composed of both), and would thereby convert Theophrastus from a cautious Aristotelian into a dogmatic Platonist. At the same time, a climactic *kai* ("even this") would be rhetorically and logically quite out of place. I suspect that the considerable favor this emendation has met with⁷⁴ is perhaps due, in part at least, less to its viability in this context than to its producing a sentence that can be easily detached from this treatise and included in anthologies of fragments.

If, then, we prefer to retain the transmitted *kakeinois*, how is it to be interpreted? Ross takes it to refer to the materialists whose position is illustrated in this sentence: not only their opponents, but even the materialists themselves (*kai* = "etiam") would be uncomfortable with one of the consequences of the materialist position.⁷⁵ In general terms, such an argumentative strategy, which deploys the consequences of some philosophical doctrine against its proponents, thereby turning them into unwitting opponents of themselves, is not uncharacteristic of Theophrastus.⁷⁶ But an interpretation of the present sentence along Ross's lines is vitiated by a grave objection. For there can be no doubt that the group of materialists includes Heraclitus (he is certainly among those *hosoi pur kai gēn*, 6b25–26),⁷⁷ so that in Ross's view he is one of the *ekeinoi*. But the materialist position, which these *ekeinoi* would find absurd, is illustrated precisely by a citation from Heraclitus (14–15), so that Theophrastus would be saying that Heraclitus would find one of Heraclitus' own aphorisms absurd.

This seems to be pushing Heraclitean paradox, and Theophrastean exegesis, beyond acceptable limits. Evidently, this sentence is to be interpreted along the lines of a number of passages in Aristotle that formulate the objection against the materialists that there is a contradiction between the formlessness of their principles and the structure of our world.⁷⁸ In such passages, Heraclitus is cited simply as an example of the doctrine under attack and does not turn State's evidence to become a witness for the prosecution.

The previous sentence had distinguished three groups of philosophers—(1) the proponents of purely formal principles (*hoi men oun emmorphous pasas* 7a6–7: broadly speaking, Platonists),⁷⁹ (2) those of purely material principles (*hoi de monon tas hulikas* 7a7: broadly, pre-Socratics), and (3) those of mixed material-formal principles (*hoi d' amphō . . .* 7a7–10:⁸⁰ again, broadly, Aristotelians)—and the merits of the other two groups (the formalists and the mixed) as potential candidates for the antecedent of *kakeinois* seem not to have been adequately examined. Against the first group (the formalists) speak considerations of both logic (there is nothing surprising in the formalists' considering the materialists' position absurd: why then should Theophrastus have added the word *kai*?) and grammar (*ekeinos*, when it is not used together with *houtos* to distinguish former from latter, generally refers to the nearest available antecedent).⁸¹ The same considerations are decisive in favor of the third group: (not only the materialists' natural opponents, the formalists, but) the proponents of mixed principles as well (additive *kai*) would consider the contradiction between formless principles and the structured world absurd. If, as often, *ekeinos* here designates something familiar and well-known,⁸² that might provide further evidence for identifying the mixed position with the Aristotelians.

The real textual difficulties, however, begin with the Heraclitus citation itself. The manuscripts' unanimously transmitted *sarx* has found few advocates:

First, H. Gomperz suggested deleting both articles and translating, “der Menschenleib: zufälliger Ergiessung (d.h. des Samens) vollkommene Wohlgestalt.”⁸³ But the doubly interpolated article is implausible, the required separation between *sarx* and *kechumenōn* scarcely tolerable, and the meaning assigned to the latter word quite strained; furthermore, both the context in Theophrastus and the usage of *kosmos* elsewhere in Heraclitus⁸⁴ suggest that here too the word should refer to the universe.

Second, McDiarmid restricted the quotation to *sarx eikēi kechumenōn ho kallistos* and translated the passage, “but as Heraclitus says ‘the fairest man is flesh composed of parts scattered at random’ so is the cosmos.”⁸⁵ Friedländer adopted the suggestion but, recognizing that McDiarmid's Greek phrase could scarcely be made to yield his English meaning (what kind of genitive is *kechumenōn*?), he emended the text so as to provide the desired sense, *sarx eikēi kechumen<ē anthrōp>ōn ho kallistos*.⁸⁶ Though this approach has met with the approval of Kranz⁸⁷ and Kirk,⁸⁸ it is surely mistaken.⁸⁹ For, first, what are we to do with *ho kosmos*? On this line of interpretation, the words can hardly be construed, and certainly cannot be made to yield “so is the cosmos” (nor can “so is” be derived from *hōsper*, since McDiarmid implausibly attaches that word to the distant *phēsin*, without citing parallels for such an anomalous separation);⁹⁰ furthermore, the syntax of *phēsin* practically requires that the

words following *Hērakleitos* be part of the quotation.⁹¹ And second, it is true that, without Friedländer's emendation, Theophrastus' words will not yield McDiarmid's sense: yet that emendation is itself unpersuasively drastic. Moreover, would we not expect the phrase *sarx eikēi kechumenē* to describe not a single intact human body, but the contents of a butcher's shop or the horrific aftermath of a bloody battle?

Hence, it would seem, *sarx* must go. What should replace it? With the exception of some palaeographically implausible suggestions by Bergk,⁹² all the emendations hitherto proposed have substituted for *sarx* a nominative singular substantive upon which *eikēi kechumenōn* is made to depend:⁹³ "like an *x* of things scattered at random [is] the fairest world-order." Yet this approach has at least four drawbacks: (1) The construction required, an adverbially modified substantivized neuter plural participle used absolutely in the genitive case and depending upon a substantive, seems implausibly sophisticated for archaic Greek prose: in Aristotle or Theophrastus himself, such a construction would be unremarkable, but there is certainly no parallel for it in Heraclitus and apparently none in any other early prose author.⁹⁴ (2) Since *kallistos* is taken to modify *kosmos*, the manuscripts' repetition of the article is ungrammatical:⁹⁵ hence Wimmer and Usener and their followers are obliged to delete the second *ho*, but their reasoning (that it was interpolated by a copyist who had mistakenly attached *ho kallistos* to *Hērakleitos*)⁹⁶ seems far-fetched. (3) No plausible reason has been given for why Theophrastus should have chosen to interject *phēsin Hērakleitos* so strikingly between the adjective *kallistos* and the noun it governs, *kosmos*. Ross suggests that this was done "in order to emphasize *kallistos* and bring out the contrast with *sarxa eikēi kechumenōn*,"⁹⁷ but one would think that that contrast was already sufficiently emphasized by Heraclitus' language and word order, and the effect instead is an inexplicable isolation of *kosmos* from the rest of the sentence. (4) What is *ho kallistos kosmos*?⁹⁸ Surely not "the fairest of all world-orders." Which would be the other, less fair ones? But even "this very fair world-order" is hardly satisfactory: elsewhere, Heraclitus' superlatives are genuine superlatives.⁹⁹

These difficulties are of varying weights, but together they suggest the advisability of rethinking the passage. It would seem that the critics' decisive prejudice has been to attach *kallistos* to *kosmos*, for this has entailed making *eikēi kechumenōn* dependent upon the word substituted for *sarx*. But one can suggest another construction that is simpler and likelier: taking *eikēi kechumenōn* as a partitive genitive attached to *ho kallistos*, and *ho kosmos* as a predicate defining that preceding phrase.¹⁰⁰ Pursuing this line of reasoning, we shall be able to retain both articles but shall need to replace *sarx* with a word in the genitive plural which the participle *kechumenōn* can modify, and as we know from *ho kallistos*, it will have to be masculine. These considerations suggest the following emendation:

ἀλλ' ὥσπερ σωρῶν εἰκὴ κεχυμένων ὁ κάλλιστος,
φησὶν Ἡράκλειτος, "ὁ κόσμος".

but, says Heraclitus, "just like the most beautiful of the heaps piled at random [is] the world-order."

The corruption is easily explained: in minuscules, alpha and omega are often confused; and the archetype need only have abbreviated *sōrōn* by using a common compendium for its genitive plural ending to provoke its misreading as *sarx*. The word *sōros* is attested as early as Hesiod (*W&D* 778); for the phrase *sōrōn kechumenōn*, cf. Herodotus 1.22.1 (*sōron Megan sitou kechumenon*), 2.75 (*katakechuatai*), and *Anth. Plan.* 4.254.1–2 (*echeuan/anthrōpoi lithinon sōron*). Heraclitus himself provides numerous parallels for phrases beginning with the genitive,¹⁰¹ for genitive plurals preceding the word governing them,¹⁰² for elision of the copulative,¹⁰³ and for *hōsper* or *hokōsper*;¹⁰⁴ and he provides parallels perhaps too for this particular construction: first a partitive genitive plural, then the superlative adjective upon which it depends, and finally a surprising predicate.¹⁰⁵

As for the meaning of this passage:¹⁰⁶ in the world we see there are many heaps piled at random, for example, heaps of corn. They seem to be paradigms of disorder. Our universe in fact has a high degree of order—*kosmon ton auton hapantōn*¹⁰⁷ *oute tis theōn oute anthrōpōn epoiēsen, all' ēn aei kai estin kai estai pur aeizōon, haptomenon metra kai aposbennumenon metra* (22 B 30)—yet it is in constant motion and flux and therefore seems to be quite chaotic. In that regard, the universe is indeed much like ordinary piled-up heaps. But it also has an immanent structure, which makes it like the most beautiful of such heaps, and only thereby does it become a cosmos.¹⁰⁸ There is an evident paradox in the application of the term *kallistos* to a randomly piled-up heap—a paradox typical both of Heraclitus' style and of his philosophy.¹⁰⁹

Heraclitus has scored a point off of those who think that the world is just a jumble by pointing out that it is the most beautiful of such jumbles and hence cannot be merely jumble. Now Theophrastus turns Heraclitus' own aphorism against him.¹¹⁰ Like any fourth-century philosophical writer, Theophrastus naturally takes Heraclitus' *kosmos* to mean "the world"¹¹¹ and thus equates it with *ho holos ouranos kai hekasta tōn merōn hapanta* (11–12). Hence, in Theophrastus' view, Heraclitus will be saying that the world is in appearance a beautiful chaos. But thereby he will have impaled himself upon one or the other of the horns of Theophrastus' dilemma: for if it is really chaos, how can

it be beautiful? And if it is really beautiful, how can its principles be devoid of form?

NOTES

1. Support from the Forschungsstätte der Evangelischen Studiengemeinschaft (Heidelberg) facilitated our meetings.
2. Helpful criticisms of this paper have been given by A. Code, D. Furley and K. Gaiser.
3. W. Jaeger, *Aristoteles, Grundlegung einer Geschichte seiner Entwicklung* (Berlin 1923, 1955), 374; E. Grumach, *Physis und Agathon in der alten Stoa = Problemata* 6, Berlin 1931, 56–64; P. Merlan, "Aristotle's Unmoved Movers," *Traditio* 4 (1946), 1–30, here 29–30; W. Theiler, "Die Entstehung der Metaphysik des Aristoteles mit einem Anhang über Theophrasts Metaphysik," *Mus. Helv.* 15 (1958) 85–105; G. Reale, *Teofrasto e la sua aporetica metafisica* (Brescia 1964), 103–34 = English translation in G. Reale, *The Concept of First Philosophy and the Unity of the Metaphysics of Aristotle* (Albany, N.Y. 1980), 364–91; D. Frede, "Theophrasts Kritik am unbewegten Beweger des Aristoteles," *Phronesis* 16 (1971) 65–79; H.J. Krämer, "Zum Standort der Metaphysik Theophrasts," pp. 206–14 in *Zetesis: Album amicorum . . . E. de Strijcker* (Antwerp/Utrecht 1973); D. Devereux, "On the Relation between Theophrastus' *Metaphysics* and Book Lambda of Aristotle's *Metaphysics*," in the present volume. Cf. now also K. Gaiser, *Theophrast in Assos. Zur Entwicklung der Naturwissenschaft zwischen Akademie und Peripatos* = SB Heidelberg 1985:3 (Heidelberg 1985), 54f.
4. For an example of the results that can be obtained by studying the relations between Theophrastus' and Aristotle's scientific writings, cf. O. Regenbogen, "Eine Polemik Theophrasts gegen Aristoteles," *Hermes* 72 (1937) 469–75.
5. This is certainly the impression created by the comments on this section of the *Metaphysics* in the editions of W.D. Ross-F.H. Robes (Oxford 1929 = Hildesheim 1982), 71f., and Reale, *op. cit.* (n.3), 73ff., 201ff.; and it is the basic premise of the only special study of this issue with which I am familiar, J.G. Lennox, "Theophrastus on the Limits of Teleology," *Rutgers Studies in Classical Humanities* 2 (1985) 143–63. Though I am indebted to Lennox's clear discussion, it will be obvious that I am in disagreement with him both in general conclusions and on many questions of detail; for reasons of economy I have preferred here not to discuss exhaustively our areas of disagreement.
6. E.g., W. Theiler, *Zur Geschichte der teleologischen Naturbetrachtung* (Zurich 1925), 102ff.; S. Sambursky, *Das physikalische Weltbild der Antike* (Zurich/Stuttgart 1965), 141–42; G.E.R. Lloyd, *Early Greek Science: Thales to Aristotle* (London 1970), 122, and *Greek Science after Aristotle* (London 1973), 9.
7. Cf. I. Düring, *Aristoteles, Darstellung und Interpretation seines Denkens* (Heidelberg 1966), 51–52, 506ff., and RE Suppl. 11 (Stuttgart 1968), s.v. Aristoteles, 259ff. On the sequence of Aristotle's biological writings, cf. now H. Flashar in *Ueberwegs Grundriss der Geschichte der Philosophie. Die Philosophie der Antike. Band 3: Aeltere Akademie-Aristoteles-Peripatos*, ed. H. Flashar (Basel/Stuttgart 1983), 270, 274.
8. So too, at 7a19ff. Theophrastus speaks of explanation in terms of final cause (*pros to heneka tou*) applied to all cases (*en hapasin*) as *chalepon*, not as impossible. This fundamental point is misunderstood by M. van Raalte, "The Idea of the Cosmos

as an Organic Whole in Theophrastus' *Metaphysics*," in the present volume, who suggests unconvincingly that Theophrastus is proposing a nonteleological, "organicist" view; here too, though it will be obvious to the reader that I do not share many of her views, I have preferred not to repeat at length the criticisms of them I expressed in my comments on her paper at the June 1985 London Theophrastus Conference.

9. Not, as Ross translates it, "practically," which would mean that these features really were to a certain extent useless (and certainly not, as Reale translates it, "di fatto"); rather, *hōsper* is being applied semi-apologetically, here as elsewhere, to soften the force of a word which is not being used in its strict sense but as it were metaphorically, and hence means that these features in fact might not be useless after all. A less misleading translation would be "apparently."
10. GA 1.19.726a34, a35, 727a28, b31, 1.20.727b34, 729a21 *bis*, 30.
11. The ending *-sis* generally denotes a process: cf. E. Schwyzer, *Griechische Grammatik* 1 (Munich 1953), 504f.; G. Röttger, *Studien zur Platonischen Substantivbildung* = Kiel. Arb. z. Kl. Philol. 3, Würzburg 1937, 3ff., 15ff., 28ff.; A.A. Long, *Language and Thought in Sophocles: A Study of Abstract Nouns and Poetic Technique* (London 1968), 14ff.
12. Cf. Theophr. *De ventis* 20; in Aristotle, *proesis* is almost always construed with an objective genitive of the material which is emitted.
13. This view is not unique to him: cf. e.g. Hipp., *Nat. Puer.* 15.2.
14. Indeed, the two passages are so close that Ross attempts to emend the evidently corrupt sentence in Theophrastus by adding to it words suggested by Aristotle's language: cf. Ross 71 *ad* 10b12. Of course, acknowledging the closeness of the two passages does not compel one to adopt Ross' conjecture.
15. As far as the day-fly's death goes, Aristotle might well have considered it to be *kata phusin*, since it is not due to external causes, cf. *Resp.* 17.478b24ff. But Theophrastus here is discussing its life, and it is its life Aristotle calls peculiar.
16. Precisely the same words are found at *Phaedo* 78c6; cf. also the whole passage 78c-79a, 79d5, 80b2; and variants often elsewhere, *Rep.* 5.479a2, e7-8, 6.484b4; *Tim.* 29a1, 41d7; *Soph.* 248a12, 249b12, 252a7-8; *Pol.* 269d5; *Phil.* 19b4, 61e2; *Laws* 9.872a6, 10.898a8, b5; *Epin.* 982b3, e3. It should be pointed out that P has *tauta* (without an accent) here and all the other manuscripts of Theophrastus' treatise have *taûta* (with a circumflex); Ross' reading is derived from the sixteenth century Latin translation (presumably by Bessarion), which renders the word as *idem*.
17. This interpretation was suggested to me by A. Code.
18. But, in Aristotle's argument with regard to the generation of animals in GA 2.1, they are discussed not *qua* animals but *qua* members of a species of animals (*eidei, genos* 731b35).
19. The references are collected at H. Bonitz, *Index Aristotelicus* (Berlin 1870, Graz 1955), 104b16-28. Düring, *Aristoteles, op. cit.* (n. 7), 514, points out that there is no evidence that Aristotle not only intended to write this treatise, but actually did so.
20. *Krasis* can denote both the activity of mixing and the result (cf. Bonitz *ibid.*, s.v. 407b46); but these two passages make it extremely unlikely that Theophrastus might be referring to some process of mixing supposed to take place in the central chamber of the heart (not, as far as I can see, an Aristotelian doctrine, cf. e.g. *De Somno* 3.458a20, which speaks of a separation of blood [*diakrisis*] as taking place in that chamber).

21. For the descriptive use of these terms with regard to varieties of blood, cf. especially *PA* 2.2.647b31ff.; also *De somno* 3.458a12f.
22. Interpretation (c) of Case 8 would belong to this group.
23. Interpretation (b) of Case 8 would probably belong to this group.
24. Interpretation (a) of Case 8 would belong to this group.
25. Hence Reale's perplexity, *op. cit.* (n. 3), 201 n. 2 ad 10b9: "Esempio, questo, poco felice, in quanto il *fine*, qui, è abbastanza manifesto."
26. *Op. cit.* (n. 5.)
27. Cf. most recently especially W. Kullmann, *Die Teleologie in der aristotelischen Biologie* = SB Heidelberg 1979:2 (Heidelberg 1979) and "Wesen und Bedeutung der 'Zweckursache' bei Aristoteles," *Berichte zur Wissenschaftsgeschichte* 5 (1982) 25–39.
28. Cf. J.D. Denniston, *The Greek Particles* (Oxford 1954), 487–88.
29. This was a much-debated issue in antiquity: cf. e.g. Soranus, *Gyn.* 1.27–29 (CMG 4.17.17ff.), and in general E. Lesky, *Die Zeugungs- und Vererbungslehren der Antike und ihr Nachwirken* = Abh. Mainz 1950:19 (Wiesbaden 1951).
30. With regard to the various aspects of Theophrastus' use of aporias, I have benefited much from a working paper on Theophrastus' aporematics written by A. Laks in the course of the preparation of our forthcoming Budé edition.
31. E.g., *Metaph.* B.1.995a27ff.
32. Originally in German, this section has been translated into English by Glenn Most.
33. Cf. e.g. H.J. Krämer, "Zum Standort der Metaphysik Theophrasts," pp. 206–14 in *Zetesis: Album amicorum . . . E. de Strijcker* (Antwerp/Utrecht 1973) here 211 and *passim*.
34. Cf. W. Theiler, "Die Entstehung der Metaphysik des Aristoteles mit einem Anhang über Theophrasts Metaphysik," in *idem*, *Untersuchungen zur antiken Literatur* (Berlin 1970) 338.
35. G. Patzig, "Theologie und Ontologie in der Metaphysik des Aristoteles," *Kantstudien* 52 (1960/61) 189ff.
36. So W.D. Ross and F.H. Fobes, *Theophrastus Metaphysics* (Oxford 1929 = Hildesheim 1982) 65 *ad loc.*
37. Originally in French, this section has been translated into English by Glenn Most.
38. See H. Bonitz, *Index Aristotelicus* (Berlin 1870-Graz 1955), under these two entries.
39. This is what is established by the triangulation of *Metaph.*, Lambda 10.1075b37–76a3 (cited below, n. 42), Nu 3.1090b16–20, and Zeta 2.1028b21–24. Cf. M. Isnardi Parente, *Speusippo. Frammenti* = *La Scuola di Platone* 1 (Naples 1980), *ad fr.* 52 I.P., p. 274; L. Tarán, *Speusippus of Athens. A Critical Study with a Collection of the Related Texts and Commentary* (Leiden 1981), *ad fr.* 37 T., p. 321.
40. Unless otherwise indicated, the translations of Aristotle are taken from J. Barnes, ed., *The Revised Oxford Translation*, 2 vols. (Princeton 1984).
41. *Poetics* 9.1451b34f.: "Of simple plots and actions the episodic are the worst. I call a plot episodic when there is neither probability nor necessity in the sequence of its episodes." On the meaning of the Aristotelian criticism, cf. P. Merlan, *From Platonism to Neoplatonism* (The Hague 1968), 118f.; Tarán, *op. cit.* (n. 39), 322.
42. "And those who say mathematical number is first and go on to generate one kind of substance after another and give different principles for each, make the substance of the universe a series of episodes (for one substance has no influence on another by its existence or non-existence), and they give us many principles;

- but the world must not be governed badly. 'The rule of many is not good, let there be one ruler' [*Iliad* 2.204]" (1075b37–76a5).
43. As is well known, Book Lambda probably formed an autonomous treatise originally; cf. W.D. Ross, *Aristotle's Metaphysics* (Oxford 1924) I.xxviif. Although Theophrastus might not have known the book in the form in which it has been transmitted to us (the famous problem of chapter 8 has implications for the relative chronology of Theophrastus' treatise; see section I above), Chapter 10, in which Aristotle marks off his view-point and underlines its force, obviously has the character of a finale, with Homer as a triumphant flourish.
 44. The occurrence of *sunaptein* at 10a19 is trivial, except that the use of the term for the connection between two textual elements (*sunaptei de pōs hē nun aporia kai pros tēn hupo tou akinētou kinēsin*, referring to an earlier passage, 6a5ff.) suggests that Theophrastus may have wished to find a counterpart to Aristotle's metaphor of the episode, by conceiving of the connection of the principles and what they are the principles of on the basis of the model of literary composition. The problem of connection is operating in all the passages which aim at limiting the scope of the teleological principle (e.g., 11a13–15) and in the reflection on the methods of research appropriate for different sectors of reality (e.g., 9b24–10a5). Cf. also the use of *anaptōn* in 6b12 (below, p. 243).
 45. W.D. Ross and F.H. Fobes, *Theophrastus Metaphysics* (Oxford 1929 = Hildesheim 1982) 13. This edition is cited henceforth by the name of Ross alone when reference is to the translation or commentary.
 46. 6b20–22, at the end of the chapter, introduces an argument in favor of the opposite view.
 47. Man and horse were to become standard logical examples. Cf. e.g. Aristotle, *Cat.* 4.1b28, 2a14. The tradition is probably Academic; cf. Simplicius, *ad Phys.* A.9.192a3, p. 248.2f. Diels (= Hermodorus fr. 7 Isnardi Parente). Cf. also below, p. 243 and n. 70. On Archytas, Theophrastus' source, cf. H. Hommel, "Cicero und der Peripatos," *Gymnasium* 62 (1955) 322 (on *Laelius* 88).
 48. It is not necessary, but I think better, to give *nun* a temporal value. That the question is not one of the *nature* of the principles, but that of what one has a right to expect of a principle (its explanatory scope, cf. *apodidonai*, 6a18), whatever its nature, is clearly indicated by the parenthesis at 6a16f.: "and presumably also from any other first principles that may be assumed." This is why the praise of Eurytus is not necessarily "ironical" (W. Burkert, *Weisheit und Wissenschaft, Studien zu Pythagoras, Philolaos und Platon* (Nürnberg 1962) 35, going beyond Ross 49 *ad* 6a19, "probably"). Aristotle cites Eurytus at *Metaphysics* N.5.1092b10–13. Are the numbers causes *qua* limits (*horoi*)? "This is how Eurytus decided what was the number of what (e.g. this is the number of man, and this of horse), viz. by imitating the figures of natural things (*tōn phutōn*: there is a textual problem here we must disregard for the present) with pebbles . . ." (translation modified). On the basis of the commentary of Ps.-Alexander *ad loc.*, A. Bélis ("Le procédé de numération du Pythagoricien Eurytos," *REG* 96 (1983) 64–75) suggests (1) that Eurytus, filling in the outlines of a form by means of pebble units, was referring to "une technique de mosaïque" (72), and (2) that the numbers 250 and 360, which Ps.-Alexander attributes respectively to man and plant (*to phuton*, cf. above), have to be factored (10×5^2 and 10×6^2) so that they do not exceed the decade (73f.). The first point is indeed implied by the commentator's description, but it does not really correspond to Aristotle's doxography, in which the pebbles play the role of limits. The second presupposes,

- if one wishes to derive something from it for Eurytus, that the equations (man = 250, plant = 360) can be attributed to him. But Ps.-Alexander's formulation does not go in this direction: "*keisthō logou charin . . .*" (827.9 Hayduck) reads more naturally if Ps.-Alexander himself is choosing the numbers by means of which he undertakes to explain Eurytus' doctrine. But does not this choice, which certainly has a deliberately Pythagorean coloring, determine the nature of the procedure itself? This would weaken somewhat the value of the testimony. Cf. Burkert, *loc. cit.*, n. 124.
49. Cf. H.J. Krämer, "Zum Standort der Metaphysik Theophrasts," in: *Zetesis: Album amicorum . . . E. de Strijcker* (Antwerp/Utrecht 1973) 209 and 213f. (with chronological implications).
 50. Speusippus, fr. 87 I.P. = 59 T.; Xenocrates, fr. 26 Heinze = 100 I.P. (*Senocrate-Ermodoro. Frammenti = La Scuola di Platone* 3, Naples 1982); Hestiaeus, cf. H.J. Krämer in *Ueberwegs Grundriss der Geschichte der Philosophie. Die Philosophie der Antike. Band 3: Aeltere Akademie-Aristoteles-Peripatos*, ed. H. Flashar (Basel/Stuttgart 1983) 128f.; Plato, T.P. 30 Gaiser (*Platons ungeschriebene Lehre*, Stuttgart 1968² 493f.). The relation between the doctrine of the One and of the unlimited Dyad, which opens the chapter, and the other notices, in particular the summary attributed to Plato, is problematic. The interpreters are divided or hesitant among three options: (a) This is an exposition of the (nonwritten) doctrine of Plato himself (in this case, 6b11–15 constitutes a supplementary remark); cf. L. Robin, *La théorie platonicienne des Idées et des Nombres d'après Aristote* (Paris 1908 = Hildesheim 1963) 316 n. 275; Gaiser, *op. cit.*, 493f. and 529; and the bibliographical indications cited by M. Isnardi Parente, "Théophraste, *Metaphysica* 6a23ss.," *Phronesis* 16 (1971) 50 n. 4. (b) It is a position common to all the members of the Academy or to a majority of them, from whom several eminent representatives are then distinguished, but with which some of these at least could have identified themselves; cf. Isnardi Parente, *op. cit.*, 61f., and *op. cit.* (n. 39), 323f. (*ad* fr. 87, with bibliography); Krämer, *op. cit.* (n. 49), 209 n. 16; H. Happ, *Hyle* (Berlin 1971) 209 n. 660; and earlier R. Heinze, *Xenocrates* (Leipzig 1892 = Hildesheim 1965) 10. (c) It is a specific position, one of the same order as that of Speusippus, of Xenocrates, or of Plato himself; cf. G. Reale, *Teofrasto e la sua aporetica metafisica* (Brescia 1964) 177f. n. 11 and 12. Despite the objections of Happ, *op. cit.*, 244 n. 833, this last position seems to me the most probable. But it would have to be supported by more detailed arguments than those used by Reale.
 51. Suggested by H. Ritter, *Geschichte der pythagoreischen Philosophie* (Hamburg 1826) 146 n. 2, without a specific grammatical argument, it has been defended, on the basis of an ellipse of *paraleipousin* (6a27), by H. Usener, "Zu Theophrasts metaphysischem Bruchstück," *RhMus* 16 (1861) 270 n., and in his 1890 Bonn edition; cf. also Robin, *op. cit.* (n. 50), 316 n. 275 (8). For Reale, *op. cit.* (n. 50), the decisive consideration is the contradiction which results if one understands a form of *gennan*. Cf. also Heinze, *op. cit.* (n. 50), 49; W. Jaeger, rev. Ross-Fobes, *op. cit.* (n. 45), *Gnomon* 8 (1932) 293; E. Bignone, rev. of Ross-Fobes, *idem*, *RFIC* N.S. 9 (1931) 112–14.
 52. Heinze for example supports the claim that Xenocrates "war der einzige Platoniker, der bei der Ableitung der Wesenheiten nicht bei den obersten blieb" with the fact that "alle anderen thun des Himmels und der übrigen Dinge keinerlei Erwähnung" (*loc. cit.* [n. 51]).
 53. ". . . for if number did not exist, none the less magnitudes would exist for those

who maintain the existence of the objects of mathematics only, and if magnitudes did not exist, soul and sensible bodies would exist. But the phenomena show that nature is not a series of episodes, like a bad tragedy." Cf. *Metaphysics* Z.2.1028b24: *kai touton de ton tropon epekteinei tas ousias* (Speusippus, fr. 48 and 86 I.P. = 29a and 37 T.). Tarán, *op. cit.* (n. 39), 321 *ad* fr. 37, notes that one cannot with full rigor deduce from the text of Aristotle that the sensibles came *immediately* after the soul.

54. Cf. Ross 55f. *ad* 6b3–4, who sees in *hama* after *chronon* a reminiscence of Aristotle, *Metaphysics* Lambda 6.1072a2f.: (Plato cannot make of the self-moving soul the principle, as he suggests) *husteron gar kai hama toi ouranoi he psuche, hos phēsi*. Naturally, the reference to the *Timaeus* could also be indirect, and *hama* could have a purely logical sense; cf. Isnardi Parente, *op. cit.* (n. 50), 50f. Cf. below, p. 241–2.
55. Cf. M. Baltes, *Die Weltentstehung des platonischen Timaios nach den antiken Interpretationen*, Teil I = *Philosophia Antiqua* 30 (Leiden 1976) 18ff.
56. The athetesis of 7a15–19, cited as a parallel by Usener in his edition, is arbitrary; cf. Ross 61f. *ad loc.* 10b1 and b4–6, athetized respectively by Ross and by Usener-Ross, must also be kept; cf. our forthcoming Budé edition.
57. As far as I can see, the interpreters do not discuss this hypothesis.
58. Cf. Tarán's critique of Isnardi Parente's interpretation, *op. cit.* (n. 39), 380 n. 192.
59. Cf. Aristotle, *De caelo* A.10.279b33–280a2, with the scholium *ad loc.*; cf. Baltes, *loc. cit.* (n. 55).
60. Cf. in this sense E. Zeller, *Die Philosophie der Griechen* 2.1 (Leipzig 1922⁵) 950 n. 10, who interprets (wrongly) *hama* in this way, after *chronon*: "die Zeit aber stamme von beiden, der unbegrenzten Zweiheit und dem Eins, zugleich."
61. Ross 56 *ad* 6b3–4 refers to 5a27.
62. Isnardi Parente, *op. cit.* (n. 50), 54 n. 12. But the text printed both in her edition of the fragments of Speusippus (fr. 87) and in that of the fragments of Xenocrates (fr. 100) follows Ross' punctuation.
63. Cf. above n. 58.
64. Ross 56 *ad* 6b4.
65. Cf. above, n. 48. This is the sense of the (justified) criticism directed by Reale against Ross, *op. cit.* (n. 50), 178 n. 14.
66. Cf. the passage in *Metaphysics* N.5.1092b10–13, cited above n. 48.
67. So too, at 7a11, where the rest of the manuscripts have *ouranos*, Mutin. Estensis α.T.9.11 = Gr. 46 reads *ho anthrōpos*. This emendation was arrived at by G.W. Most and myself independently and simultaneously in the course of a correspondence on the subject.
68. For Speusippus' links with Pythagorean doctrines, cf. the references provided by Tarán, *op. cit.* (n. 39), 89 n. 415. As for the series established by the proponents of the One and of the Dyad, they are reminiscent of the Pythagorean *sustoichia*.
69. This is the fragment, in Ross' translation: "for *he* does somehow assign everything its place in the universe, alike objects of sense, objects of reason or mathematical objects, and divine things as well" (13–15; cf. *ad* 6b6–9).
70. "But if number goes only up to 10, as some say, firstly the Forms will soon run short; e.g. if 3 is man-in-himself, what number will be the horse-in-itself?"
71. According to the definition transmitted by Proclus, Xenocrates made of the Idea "the paradigmatic cause of what subsists always in conformity with nature" (fr. 30 Heinze = 94 Isnardi Parente; cf. her commentary *ad loc.*).
72. The text is cited from W.D. Ross and F.H. Fobes, ed., *Theophrastus Metaphysics*

- (Oxford 1929) referred to henceforth by Ross' name alone when the translation or commentary is meant. To the *variae lectiones* listed in Ross-Fobes' apparatus, add 7a10 *doxoien* C, 11 *ouranos* | *ho anthrōpos* Mutin. Estensis α.T.9.11 = Gr. 46, 12 *hapanta* L, *hapanta te* O.
73. T. Bergk, "Theophrastus Metaph. p. 314, 8 ed. Br.," in *Kleine philologische Schriften* 2 (Halle 1886) 302–303, here 302.
 74. It is accepted in the editions of Heraclitus by I. Bywater (Oxford 1877) 19, C. Diano-G. Serra (Milan 1980) 106 n. 1, and H. Diels (Berlin 1901) 28; in the editions of the pre-Socratics by H. Diels-W. Kranz (most recently Berlin 1956⁸); and in the edition of Theophrastus' *Metaphysics* by H. Usener (Bonn 1890) 7.
 75. Ross 61 *ad* 7a10. G. Reale's translation, in his *Teofrasto e la sua aporetica metafisica* (Brescia 1964) 182, goes even a step further, translating "Ma a coloro che pongono solo principi materiali, dovrebbe parere assurdo . . ." and omitting the *kai*.
 76. E.g., *Metaph.* 5a27–28, 8a6–7; *De sens.* 70–71, 79.
 77. So too Ross 60 *ad* 6b25. For fire in Heraclitus, cf. B 30, 31, 63, 64, 66, 67, 76, 90. This forms part of the standard ancient doxography on Heraclitus: cf. Aristotle, *Metaph.* A.3.984a7, *Dox.* Gr. 284a4f. Diels and, from Theophrastus himself, 475.15ff. On Theophrastus' reporting of Heraclitus, cf. J. Kerschensteiner, "Der Bericht des Theophrast über Heraklit," *Hermes* 83 1955 385–411.
 78. E.g., *Phys.* 205a3, *Metaph.* A.3.984b11–15.
 79. So too Ross 61 *ad* 7a6–7.
 80. At 7a9, there is no reason to accept the *on* added in Usener's 1890 Bonn edition and taken over by Ross: this participle is often omitted, cf. E. Schwyzer, *Griechische Grammatik* 2 (Munich 1950) 404–405.
 81. Cf. LSJ s.v. *ekeinos* I.1. So in Theophrastus, *Metaph.* 5a4, 26, 6b19, 9b13, 11a14.
 82. *Ibid.* I.2.
 83. *Apud* H. Diels, *Die Fragmente der Vorsokratiker, Nachträge zusammengestellt für die Besitzer der dritten Auflage* (Berlin 1922) xxvi; Diels' comment is, "schwerlich richtig."
 84. Cf. especially J. Kerschensteiner, *Kosmos* = *Zetemata* 30 (Munich 1962) 97–114.
 85. J.B. McDiarmid, "Note on Heraclitus Fragm. 124," *AJPh* 62 (1941), 492–94.
 86. P. Friedländer, "Heraclitus Fragm. 124," *AJPh* 63 (1942) 336.
 87. H. Diels-W. Kranz, *Fragmente der Vorsokratiker*⁶ (Berlin 1951) Nachtrag I.494.40.
 88. G.S. Kirk, *Heraclitus, The Cosmic Fragments* (Cambridge 1954) 82, 220, 313.
 89. Cf. especially M. Marcovich, *Eraclito Frammenti* (Florence 1978) 377.
 90. McDiarmid, *op. cit.* (n. 85), 493, wishes to attach *hōsper* to *phēsin* because he finds objectionable the use of such a verb without a grammatical connection to the rest of the sentence. Yet precisely such a use of *phēsin* is quite common (in Theophrastus himself, e.g. *De sens.* 3; elsewhere, as K. Gaiser has most helpfully pointed out to me *per litt.*, e.g. Diog. Laert. 7.162, 10.12); hence the addition of *hōs* before *phēsin* by H. Hommel *apud* B. Gladigow, *Sophia und Kosmos* = *Spudasmata* 1 (Hildesheim 1965) 119 n. 1 and by M. Marcovich, *loc. cit.* (n. 89), is quite unnecessary. On the other hand, I have found no parallel for such a wide separation between *hōsper* and *phēsin* as McDiarmid postulates.
 91. Cf. Diano-Serra, *loc. cit.* (n. 74), and Kerschensteiner, *op. cit.* (n. 84), 97 n. 1.
 92. *Op. cit.* (n. 73), 303: "*ex astriōn* (sive *astragalōn mavis*)."
 93. *sarma*: H. Diels, rev. I. Bywater, *op. cit.* (n. 74), in: *Jenaer Literaturzeitung* 25 (1877) 393–95, here 394. *saron*: J. Bernays *apud* P. Schuster, *Heraklit von Ephesos*

- = Acta Soc. Philol. Lips. 3 (Leipzig 1883) 390. *sōros*: H. Usener, "Zu Theophrasts metaphysischem Bruchstück," in *Kleine Schriften* 1 (Leipzig 1912) 106; F. Wimmer, ed., *Theophrasti Eresii opera quae supersunt omnia* (Leipzig 1862) 3.xxvii *ad loc. stragx*: Bergk, *op. cit.* (n. 73), 739.
94. The only apparent parallels in Heraclitus are specious: in B 8, *ek tōn diapherontōn kallistēn harmonian*, the article renders the substantivization easier, and *ta diapheronta* is found frequently elsewhere, especially in Thucydides and the orators; in B 75, *sunergous tōn en tōi kosmōi ginomenōn*, both considerations apply again, and furthermore the prepositional phrase seems most likely to derive from Marcus Aurelius anyway (cf. Kerschensteiner, *op. cit.* [n. 84], 112–13). Cf. Diano-Serra, *loc. cit.* (n. 74).
95. Cf. R. Kühner-B. Gerth, *Ausführliche Grammatik der griechischen Sprache. Zweiter Teil: Satzlehre* (Hannover and Leipzig 1898 = Darmstadt 1963) 1.613–15.
96. So Wimmer, *op. cit.* (n. 93), and Usener, *op. cit.* (n. 93), 106, followed by Ross, *op. cit.* (n. 72), 61, and Marcovich, *loc. cit.* (n. 89).
97. Ross 61 *ad* 7a14; his view is followed tentatively by Marcovich, *loc. cit.* (n. 89). The justification for this placement suggested by Jean Bollack and Heinz Wismann, *Héraclite ou la séparation* (Paris 1972) 339, is, "Le superlatif introduit un sujet sous-entendu, qu'il faut tirer de l'attribut, d'où la place de l'incise (*dit Héraclite*) dans la phrase de Théophraste."
98. Of course, a phrase like *kalliston kosmos: poiēma gar theou* (attributed to Thales in Diog. Laert. 1.35) cannot provide an answer, for *kalliston* there is predicative, not attributive. Bollack-Wismann, *loc. cit.* (n. 97), explain the superlative as due to the fact that the arrangement is divine; yet this could have been expressed just as well by the positive degree. Their explanation, "*le plus beau*, qui englobe les arrangements dans l'arrangement des arrangements," does not help much; nor does Heidegger's, in M. Heidegger-E. Fink, *Heraklit* (Frankfurt a.M. 1970), 105: "*kallistos kosmos* könnte man übersetzen: der *kosmos*, wie er überhaupt nur sein kann."
99. Cf. B 8, 28, 29, 49, 57, 61, 82, 83, 112, 118, 121.
100. Up to this point, this is the solution proposed by Bollack-Wismann, *op. cit.* (n. 97), 338, who alone have recognized that *eikēi kechumenōn* should be attached to *ho kallistos*: they print the fragment as *eikēi kechumenōn ho kallistos: ho kosmos* and translate it, "Des choses jetées là au hasard, le plus bel arrangement, ce monde-ci." But their substantivized *kechumenōn* remains problematic, and they do not succeed in finding a plausible logical or grammatical connection between their version of the Heraclitus aphorism, *hōsper sarx*, and the rest of the sentence: their paraphrase of Theophrastus—"qu'il devrait paraître inconséquent aux yeux mêmes des naturalistes de la cause matérielle de voir l'ordre sortir de principes sans ordre et privés de proportion, *mais comme la chair* [est faite de n'importe quoi], 'le plus bel arrangement des choses jetées pêle-mêle, le monde.'"—does not clear up matters entirely.
101. B 1, 2, 23, 45, 52, 55, 90, 108, 115, 120.
102. E.g. B 28, 53, 70, 104, 121.
103. B 54, 60, 61, 62, 67, 90; cf. also B 36, 51, 96, 118, 120.
104. *hōsper*: B 73 (and cf. B 128). *hokōsper*: B 1, 29, 44, 51, 67, 79, 90, 114.
105. B 82 (*pithēkōn ho kallistos aischros*), 83 (*anthrōpōn ho sophōtatos pros theon pithēkos*). The extent to which not only the thought but also the language of these two fragments is Heraclitean and not Platonic is disputed.
106. Cf. especially Kerschensteiner, *op. cit.* (n. 84), 97ff.

107. I cite the fragment in Clement's version: cf. the discussion in Kerschensteiner, *op. cit.* (n. 84), 99ff.
108. In fact, it may even be suggested that, for Heraclitus, the beauty of the cosmos, so far from being in genuine contrast with, is in fact instead dependent upon its being composed of apparently disparate and conflicting constituents: cf. B 8, 10, 102. On immanent structure in Heraclitus, cf. G.W. Most, "Unsichtbare Fügung: Strukturalismus und Geschichtsdenken," pp. 253–91 in E. Rudolph-E. Stöve, ed., *Geschichtsbewusstsein und Rationalität* (Stuttgart 1982), here 286–90.
109. Cf. especially U. Hölscher, *Anfängliches Fragen* (Göttingen 1968), 136–41; also e.g. Bollack-Wismann, *op. cit.* (n. 97), Index "Formes de langue" s.v. "oxymoron"; C.H. Kahn, *The Art and Thought of Heraclitus* (Cambridge 1979), *passim*, e.g. 97, 123f.
110. In general, Theophrastus' technique of citation is more problematic than has apparently sometimes been recognized. For example, at 5b17 his implied interpretation of the datives at *Il.* 8.24 makes little grammatical sense in the Homeric context of this verse but very good philosophical sense as an implied polemic response to Aristotle's citation of the same passage in *De motu an.* 4.699b36–700a2; at 8a26–27 his apparent use of part of a line from Euripides, *ouk an genoito chōris esthla*, to witness to there being more evil than good in the universe, is not borne out by the passage as a whole, *ouk an genoito chōris esthla kai kaka*, /all' *esti tis sugkrasis, hōst' echein kalōs* (*Aiōlos* fr. 21.3–4 Nauck). In such cases, it seems likely that Theophrastus' access to these classic texts was not direct, but was mediated by predecessors who had cited these passages for their own purposes. Such mediation cannot be excluded in the case of this citation from Heraclitus either.
111. Cf. Kerschensteiner, *op. cit.* (n. 77), 403.

PART IV

**PAPERS ON ETHICS, RELIGION,
AND RHETORIC**

13

The Peripatos in Cicero's *De finibus*

Olof Gigon

The construction of the *De finibus* is complex and subtle. As Cicero himself indicates in 1.6, he has drawn on Greek sources without being a mere translator. He has selected what seemed right and essential, has shortened greatly, has simplified and regrouped, and has done so in order that Greek ideas might be more accessible to the Roman reader. For the historian of Greek philosophy this may be frustrating, but there are no grounds here for faulting Cicero. He has after all left us a readable work and one that is largely responsible for the continued life of Hellenistic ethics over many centuries.

With the details of Cicero's method we cannot concern ourselves here; that is the job of a commentary. Rather we shall concern ourselves with the construction of the *De finibus* as a whole. Three doctrines are presented and refuted in five books: the doctrine of the Epicureans in Books 1–2, that of the Stoa in Books 3–5, and that of the Peripatos in Book 5. Cicero himself stands aloof from them all. He is committed to the Academy as it had developed from Arcesilaus, the heir of Socrates (2.2) through Carneades to Philon of Larissa. The Academy did not propagate a doctrine of its own, but saw its duty in proving the insufficiency of all other doctrines and in keeping up the conviction that man can never arrive at final certainties but has to be content with probabilities that do, however, differ in degree (5.76).

The work begins with Epicurus's doctrine, which is by far the easiest to understand. Since it is understandable, it seems to offer the reader the necessary easy access to philosophical problems. In reality the matter is not so simple. To learn Epicurus's doctrine by heart is an easy matter, and therefore it had become the most widespread of all philosophical doctrines, reaching "as far as the barbarian countries" (2.49). The Stoic doctrine on the other hand is the most difficult and included much that Cicero himself hardly understood (4.2). In relation to both, the Peripatos keeps the right balance: it is more demanding than Epicurus and more generous than the Stoa.

Style corresponds to content. Epicurus's style is simple and clear, nearly casual. The style of the Stoics is pedantic and indulges in hardly bearable sophistries. Aristotle and Theophrastus alone write a beautiful and impressive style. I do not repeat long-known matters: the statement that Epicurus is easy to understand and that his style is simple applies only to the two texts that are repeatedly quoted in *De finibus* 1 and 2; i.e. *Peri telous* and the *Kyriai doxai*. But by no means does it apply to *Peri physeōs*; and the judgment about the Peripatetics concerns only the dialogues of Aristotle (not his *Hypomnemata*, to which 3.10 strangely enough refers) and some writings by Theophrastus (exactly which ones is not entirely certain).

Rich in consequences is the remark that it is utterly impossible to defend either Epicurus's doctrine or that of the Stoa in political (public) life. Neither could Torquatus hold his office according to Epicurean principles (2.74–77), nor could Cato succeed as a lawyer if he relied on Stoic theses (4.21–23). Only the Peripatos does justice to political and cultural realities; unlike the others it is not forced to defend convictions in public that are different from those argued for in private circles. Connected with that is the fact that only the Peripatos can provide the politician as well as the scientist and the poet with useful directives for their work; the open-minded, encyclopedic abundance of Aristotle's and Theophrastus's works are alluded to more than once.

The situation is more complex when we look into the relationship between the three doctrines. We could proceed schematically and maintain that each doctrine rejects the two others but thus inevitably becomes more or less the ally of the one rejected doctrine against the other. That means that the Stoa unites with the Peripatos against Epicurus; the Peripatos, on the other hand, joins Epicurus against the Stoa. We must, however, keep in mind that Epicurus's relation to the Socratic school differed totally from that not only of the Stoa but also of the Peripatos (not to speak of the Ciceronian Academy), and furthermore that since the time of Posidonios there had been a tendency to force the three Socratic schools into an alliance against Epicurus. Here we are not going to discuss an obvious difficulty with such an alignment of schools: namely, that Epicurus was obviously inspired by Aristotle and maybe even by Speusippos (the theory of *alupia*, cf. Speusippus frg. 101–17 ed. Isn.-Par.). For our purposes it is more important that Antiochus of Ascalon took up the thesis of Posidonius, and by expedient (even reckless) alterations and additions set to approximating the doctrines of the Stoa and the Peripatos to each other. Summarily 3.16–19 and 62–71 may be referred to, as well as 5.71–4. Just as questionable is the way in which Antiochus manipulated the well-known *divisio Carneada* for his end. There can hardly be any doubt that Carneades in building up his doxographic system intended to show that none of the possible systems was satisfying—definitely not that of Epicurus or the Stoics, and not even that of the Peripatos. Antiochus on the other hand added

such retouches to the system that a combination of the Stoa with the *veteres* resulted in the only doctrine to be seriously defended. Relations between the doctrine of Epicurus and that of the Peripatos might be recognized but only with great caution. I am going to return to this complex later. The crucial question now seems to be, how do the three refutations proceed and from which point of view do they start?

A banal statement must be made first. The most extensive of the five books is devoted to the refutation of Epicurus; the refutation of the Stoa fills the fourth book, whereas some few pages (5.77–86) deal with the Peripatos, and they alone are followed by a counter-plea of the opponent (5.86–95). The work is rounded off with an observation by Cicero, which does not at all reveal the reserve of the Academic, but makes it clear that he feels most closely connected with the doctrine of the Peripatos, and that mainly for the above mentioned reason that no other doctrine than that of the Peripatos can provide the active politician with a philosophical foundation for his policies. Basically, however, the Academic's reserve against all three doctrines remains the same: each of them can and must be proved to have its insurmountable weaknesses. The method for giving that evidence is the same in all three cases, hence most probably the one of Carneades. As Carneades himself has no dogmatic standpoint there remain chiefly two methodological principles: the demonstration of an internal incompatibility of each of the doctrines and the hypothetical playing off of one doctrine against the others. We are going to look into that in detail.¹

The polemics against Epicurus may be summed up in two points. Firstly it is unacceptable to cut off the beginning of ethical action from its final aim. The point of departure for Epicurus is *hēdonē*, which everybody knows as such and which alone is qualified to start the movement of action in the new-born living being. The goal is the state of tranquillity and painlessness in which all movement comes to a standstill. It is accessible to the human being only, and—interpreted rigorously—even to the human being only when he has left childhood behind, for childhood is dominated by kinetic *hēdonē*. The opponent sees here two errors committed by Epicurus. First, he observes a breach in the evolution of man, insofar as the life of kinetic *hēdonē* turns into motionless *alupia* without it being clear how that happens. Second, it is against linguistic usage and absurd to call two opposite states by the same name, *hēdonē*.

Another controversy starts—which does not come out clearly in Cicero—from the assumption that Epicurus might withdraw to the simple *hēdonē* and drop *alupia*, in which case the philosophical opponent will argue that nature destines man to higher aims than just to *hēdonē*. The phrase “*ad maiora*” appears at once in 1.23 and the idea is vigorously repeated in 2.40 and 2.113–4. Thereby it becomes clear that the opponent is not, as it might seem, the

Stoa, but Aristotle, who is cited by name in 2.40. That the phrase “*doctissimi illi veteres*” (2.114) denotes no one else but Aristotle (and Theophrastus?) follows from the context. The advantages of man—both intellectual and ethical—are listed, but also the most important advantages of the body. To be sure Cicero has abridged considerably, for in 2.40 *intelligere et agere* is hardly enough in itself to single out man as *mortalis deus*, and in 5.114 it is not intelligible enough in what respect the *animi hominum* have a *quiddam caeleste et divinum*. In that passage Cicero has simply erased the prospect of a *theōrētikos bios*, such as we know it from Aristotle *EN* 1177a13–17 and as it must have been described in the dialogue *De philosophia* (cf. *De nat. deor.* 1.33).² Enough is however left to show that Carneades has staked the comprehensive Aristotelian and Peripatetic determination of man against the hypothetical reduction of the aim of human action to kinetic *hēdonē*.³

Now the Stoa: here, too, the controversy takes two directions. First, the Stoa is open to the same criticism as Epicurus: the beginning of ethical action is separated from its final aim. The first movement of the new-born human being is intended for self-preservation. Just as Epicurus had defined the elementary interest of the human being in itself ethically and psychologically as *hēdonē*, so the Stoa understands the same interest anthropologically and biologically as the desire of *conservatio sui* and protection against any alien influence that might endanger life. That desire is grounded in the nature of man (3.16). The supreme aim of human action is, however, totally different: it is what the Stoa calls *virtus*. That *virtus* has two aspects: the insight into a series of principles that are to be realized without fail, and (starting from these principles) the correct handling of all situations of external life. There results a breach that may best be explained with the most obvious case. In the first phase man has to cope solely with the preservation and defense of his own physical life; in the second phase, however, he will not hesitate to renounce that very life for the sake of *virtus*. What was first considered a first-rate “value” suddenly turns into a second-rate one. But the striving for *virtus* is inherent in human nature. That leaves the field clear for the opponent. The Stoa, like Epicurus, is forced to suppose a breach in the evolution of man; furthermore, it is not acceptable to reduce two totally different states to the very same nature, *physis*, or else to use the one word “*physis*” with two different meanings. The only way out of that would be, as before, to unify, i.e. to replace the breach with the continuity of an organic evolution and to include in man’s hereditary predisposition, beside self-preservation, the potential of *virtus*. In that case the Stoa would have to acknowledge that there are many more than just one good: namely, all that the new-born baby strives for; and that its highly prized distinction between *katorthōmata* and *kathēkonta*, between *hairēta* and *lēpta*, would have to be given up as vain. That again means that the Stoa would be forced to follow the course of the Peripatos and to accept the

difference between itself and the Peripatos as purely terminological. The idea of attacking the Stoa from the point of view of terminology lay close enough; Chrysippus, as is well known, defended Zeno in a particular pamphlet against the rebuke of having introduced into philosophy a highly artificial and also superfluous technical language. That leads us on to our last and most important point.

The Stoa had been reproached for having caused itself the greatest difficulties through its strange terminology. Without that terminology its doctrine would be identical with that of the Peripatos. One could, however, argue differently. The Stoic ethical system had, if taken literally, assumed a breach in the evolution of man, as Epicurus, though differently, had already done. Still, it could be shown that it was possible to elaborate an ethical system without that breach: the Peripatetic system, or, more precisely, the ethical system propounded by Theophrastus in his book *On Happiness* (*Peri eudaimonias*), even before Epicurus and Zeno. Both that ethical system and that book can be looked upon as the reference point from which Carneades started his controversy against Epicurus and the Stoa.

Before entering into that, a problem of text-interpretation must be mentioned. For the first book Cicero used synopses of the Epicurean doctrine by Zeno and/or Phaedrus (1.16). He professes to render the doctrine correctly and loyally (1.13), and we see no reason to distrust him. Who gave him the report about the Stoa, we do not know. Zeno and Chrysippus are cited several times; most strikingly Diogenes is mentioned three times and Panaetius twice, i.e. the two Stoics, whom, according to 2.24, Laelius must have heard. The biographical note in 2.24 seems somewhat unmotivated in the context. It takes us back into the atmosphere of *De republica*, which Cicero alludes to several times in other places in the *De finibus*. Whether that allows or even necessitates conclusions concerning the history of the origin of the work cannot be answered here.

For the fifth book the situation is clear. Piso had two philosophical teachers, Staseas of Naples, a Peripatetic, and Antiochus. Information about Cicero's sources is given both in 5.12, 75, and in 5.85–86. Fundamental is Theophrastus's *On Happiness*, from which, I believe, 5.24–70 (esp. 24–58) is a rather precise excerpt (with the addition, of course, of 5.77 and 5.86–95 in a free adaptation). For Carneades this work must have had the priceless advantage of defending that very position from which the doubtfulness of the Epicurean and the Stoic doctrine could be made most evident. It was not for nothing that Theophrastus after Epicurus was the philosopher against whom the Stoa directed its most tenacious attacks. But there was also Antiochus, whose intention was not to contrast Theophrastus with the Stoa. Rather he was eager to establish that in decisive points the Stoa and the Peripatos teach the same thing and that that was the only respectable philosophy. Thus he was

forced to turn the sense of Theophrastus's work nearly upside down. Theophrastus had laid down that of the three groups of goods—the psychic, the somatic and the social goods—each was worth being pursued for its own sake. Antiochus held the synthesis between the Peripatos and the Stoa for possible on the condition that the somatic and the social goods were rendered well-nigh insignificant. That is precisely what is done in 5.71–4 in relation to 5.24–70.

Was it Antiochus who for that purpose referred to the *Nicomachean Ethics* in 5.12? It may suffice here to point out that the reference is doubly wrong. The strange idea that the *EN* originates from Aristotle's son comes up again, as we know in Diogenes Laertius 8.88 and must go back to an author of the early first century B.C., who may not even have had the text in mind that we know as *EN*. He may only have known the title and tried to explain it. For it may be maintained that Aristotle in *EN* 1.10–11 considered the influence of *tychē* as far less relevant than Theophrastus had done (cf. esp. 1101a6–13).

It is worth while studying the text 5.24–70 more closely and to examine the intention of the conclusion of the whole work in 5.77–96. The text is preceded by 16–23, the *divisio Carneada* in an adaptation by Antiochus; this becomes clear especially at the end of 20. What is said there about the *telos* of the Stoics, only makes sense when that very distinction is made from which Carneades's criticism originates: that the meaning of "*secundum naturam*" differs totally here from the one presupposed in the note about Carneades himself (*res primae secundum naturam*) and in the note about the *veteres* (*prima naturae*). In those two cases the *prima naturae* include everything listed extensively in 18. It is a matter of course that the Stoic *kalon* does not consist in striving for strength, beauty, health and the germs of *virtus* without acquiring them. What Cicero in 3.22, correctly but rather hastily, describes as the *kalon* of the Stoa is something different: the *kalon* of the virtuous deed lies in nothing but the inner intention, which is according to nature and not in a visible success. To apply this formula to strength, beauty and health would be absurd. But Antiochus wilfully simplified, so as not to betray the weak point of the Stoic thesis, the artificial differentiation between a first *secundum naturam* (in 18) and a second (consisting in *virtus*).

Other details in this passage reveal the revision by Antiochus, above all the conclusion at the end of 23, which affirms a concurrence between the Stoa and the *veteres* as a result of the *divisio Carneada*. That was certainly not the intention of Carneades himself.

5.24–45 is a compact unit, as is clear both in its construction and in its philosophical purpose, even if we admit that Cicero occasionally simplified clumsily. Sections 24–7 form a programmatic summary of what is elaborated point by point from 27 onwards. First comes the thesis that each living being loves itself. We have to understand by that the desire for self-preservation, i.e.

the preservation of one's whole nature, body and mind equally, and that with respect to the optimum state of body and mind. This self-love, however, develops only gradually into a total awareness of one's own nature, i.e. of *sese agnoscere*. Moreover personal striving must make up for the deficiencies of nature; and finally such a development can be observed not only in the evolution of man but equally well in that of animals and even plants.

Sections 127–33 explain that self-love, i.e. the love for one's own life, which characterizes man, animal and plant—it characterizes man throughout his life, from infancy to old age and complete *sophia*. The argument is thorough, for it is here that the decisive deviation from the Stoa, from Plato and even from Epicurus starts to reveal itself. In the Stoa the situation is clearest: man begins with the unrestricted preservation of his own life; then comes the breach resulting from the knowledge that *virtus* alone matters and that life is ranged among those things that are now accepted and now rejected. In that sense the *eulogos exagōgē* plays a considerable part in the Stoa, too (3.60–1). In the same way the Epicurean disciple will be ready to quit life, namely when against all expectation the *telos*, i.e. *alupia*, is out of reach (1.49, cf. 2.95). Behind the Stoic system there stands Plato, who emphasizes in impressive passages that it is not being alive which is relevant, nor the maximum duration of life, but only living well (*Laches* 195C–D, *Charm.* 164B, 174C–D and esp. *Gorg.* 511C ff.). The Peripatetic wants to avoid the breach at any price and consequently holds that living as such remains worth conserving unrestrictedly. Only thus does the *telos* of man remain identical from beginning to end, according to the postulate made by Carneades in 2.32, 35 and 4.42 and with whose disregard he reproached Epicurus and the Stoa.⁴

The explanation of *philautia*,⁵ i.e. the love for one's own nature, is significantly followed by the question, what is to be understood by the nature of man (34–8). It is the totality of body and mind, in the way that the body and all its parts as well as the mind and all its parts are valued and preserved for their own sake. Decisive is the beginning of 37: "As we want everything in body and mind to be perfect, we value that for its own sake and are convinced that it is of supreme importance for living well." It is not possible to accentuate the contrast with the Stoa more sharply.

Even more characteristic for the attitude of the Peripatos in general and Theophrastus in particular is 39–40. Three theses stand out: philosophical insight is—as already pointed out in 24—the result of a gradual and steady development; this development is also cumulative so that the advanced stages are reached without giving up the preceding ones (as in the Stoa); both points are exemplified in the image of the vine (in an abbreviated and not very happily shortened form that example had been anticipated in 4.38–39). One is inclined to assume that it was the botanist Theophrastus who chose that example.

What finally became evident in Aristotle (as so often, in casual remarks only) is here in 41–3 elaborated in detail. In the most important matters nature provides the fundamental powers or predispositions; it leaves their further development to man. Moreover, these predispositions comprise everything, and that is what matters. Thus it is spelled out how small children already seek the company of their peers and like to please them, which doubtlessly prepares the ground for the virtue of justice. They also like to listen to stories and observe attentively everything that happens in their homes; from that there will later evolve *theōria*. Lastly they love to compete with their peers, are proud when they win and sad when they lose; in that we find engendered courage and *megalopsychia*.

Most important for us are two general conclusions. First, I am still convinced that the philosophical notion of “progressio,” i.e. *prokopē*, was created by the Peripatos, or rather Theophrastus, as is stated (though from another viewpoint) by Diogenes Laertius 7.127. Second, from that notion we cannot separate the characterization of the starting point of all progressive development as *semina* or *scintilla* or also *igniculi* (5.43 and 5.18, furthermore 4.17). Theophrastus’s ethics, not only in contrast to the Stoa, but also unlike the ethics of Aristotle (and Plato), takes its direction fundamentally (and totally) from biology—the plant and its growth serving as model. That becomes very clear in our text and is not disproved by the fact that Stoic ethics, originally conceived as a rational ontology, very soon adopted certain conceptions and notions from Theophrastus and incorporated them into the system. Biological categories had been alien to the genuinely Stoic mind.

The first main part is concluded by 44–5, referring to the Delphic maxim “know thyself” (to which already 24 is close). We may in this connection not only recall *De legg.* 1.58 and 61, and *Tusc. disp.* 5.70, but also and above all the fact that—according to the evidence given in Plutarch’s *Adv. Col.* 1118C—Aristotle reported Socrates to have been in Delphi once, to have read the maxim there and by that to have been initiated into philosophy. Aristotle’s intention is evident. He wants to replace Plato’s account *Apol.* 20E–23C, which ends in the conclusion that God alone is wise, with another version that makes it the predominant duty of man to know himself in the full extent of his nature.⁶ Theophrastus himself adopted that formulation and the reference to Delphi and interpreted it following his own conceptions. What we have to get acquainted with is the entirety of our nature, consisting in body and mind, which have to be perfected for their own sake both as a whole and in all their components (*esse per se expetendas*). Of interest is the appendix formed by section 45: How is *hēdonē* to be classified? The speaker, who obviously identifies himself with Antiochus (see 2.33 and also 3.17), excludes *hēdonē* from the totality of human nature; but he also takes into consideration the opposite opinion, which must have been that of Theophrastus.

At 46 there begins another main part. It does not start from the self-love of

man but from the wants of his nature as such. The body is disposed to preserve health and beauty (46–47), the mind is destined for cognition and action (54B–58), which reminds one of the quotation from Aristotle in 2.40. As for cognition, the desire for knowledge becomes evident already in the child and finally merges into the *bios theōrētikos*. We pass over Cicero's strange insertion 49 (strange, because it does not fulfill our expectations). There follow six names of famous *theōrētikoi*. The origin of the first group of three names is unknown; Archimedes stands in the first place, and it may generally be assumed that every mention of Archimedes by Cicero goes back to Posidonius, who must have spoken of the man more than once. The second group was doubtlessly found in Theophrastus himself. It is presented another time in 5.87–8, loaded with details; that Theophrastus reported the travels of Democritus is certified by Aelian, *Var. hist.* 4.20. The following passage as far as the middle of 53 also belongs to Theophrastus. The paragraph ends with a reference to the Isles of the Blest, which Theophrastus must have taken from the Aristotelian dialogue *On Philosophy*, which is also the source of Iamblichus, *Protr.* p. 53, 2–15 Pist. There follow appendices by Cicero that blur the transition from *intelligere* to *agere*.

The strength of man's urge for practical action is again shown by the example of children. However, the general explanation that above all the Peripatetics used to observe the behavior of children because it revealed best the intention of nature (55) must come as a surprise to the reader of Aristotle. For in the texts of Aristotle handed down to us nothing of the kind can be found: the child is simply *atelēs*, incapable both of living according to reason and of reaching happiness (cf. e.g. *Pol.* 1260a12–14, *EN* 1095a2–6, 1100a1–4). Only a thoroughly biological mind that is also aware of the ambivalence of adulthood (the adult, apart from embodying in himself everything that was predisposed in the infant, is fully exposed to the pressure of society, which a child does not yet know) will want to look for the pure and real nature in the infant. How close that is to Epicurus's position need not be discussed here (cf. 1.31 and 2.31–2).

I shall also not enter into the hierarchy of activities established in 55–8 and ending with a quotation from Plato's *Nomoi* 653A. Sections 59–64 seem to contain mainly repetitions but the accent shifts. Again the achievements of man are contrasted with those of nature, and again it is shown that the activities of the adult are fully prefigured in the child. But the physical nature of man and its claim to develop itself for its own sake are not mentioned any more. From now on *virtus* alone is dealt with, which—as the most perfect achievement of man—has to be realized for its own sake. Examples are given, probably all of them compiled by Cicero himself. (The connection of the first two examples in 64 with the goal of the argumentation is not clear.) It seems that the speaker tends to follow the course of Antiochus.

Sections 65–70 are not very clear, partly because Cicero has incorporated

materials from *De rep.* 3, as he had already done in 3.62–71. We can, however, say that it is only now that the doctrine of the three groups of goods is explicitly put forward for discussion. To the goods of the mind and the body there are added the external goods that concern man as a political animal, i.e. in his social intercourse with his next of kin, with friends, fellow-citizens, and fellow-creatures in general. To be sure the right way of handling these external goods does not constitute an autonomous part of the ethical *telos*, and that, as it seems, for two reasons. First: the individual has body and mind constantly “at his disposal,” but not relatives, friends, fellow-citizens. He may be doomed to total isolation. Second: the virtues that have to pass the test in social intercourse are identical with those that the individual has to achieve for himself. All the virtues have, so to say, two sides, one turned towards the inner self and one *foras spectans*. That is true of justice in particular. We are now very close to the considerations advanced in *EN* 1129b25–1130a13, which could doubtlessly be found in the Aristotelian dialogue *On Justice* as well.

Two insertions in the Ciceronian text may be singled out. First, 66 middle to 67 middle deals with the reciprocal relation—technically the *antakolouthia*—among the virtues: all of them are both connected with and distinguishable from each other. In this context we may refer to *EN* 1144b30–1145a2, but a text by Theophrastus is likely to be Cicero’s source. Second, 69 from “*quae quidem sapientes . . .*” onward says, somewhat surprisingly, that wise men “*tamquam videntes*” (what does it exactly mean?) conduct themselves properly in human society. In the case of the unwise man, regard for *gloria* replaces regard for *kalon*. The whole passage is likely either to belong to Cicero’s own *De gloria* or to be taken from Theophrastus’s *Peri philotimias*, which Cicero may have used himself.

In 71–4 the focus is on Antiochus and his thesis that the physical goods are so insignificant “*ut nulla esse videantur*.” That this judgment is incompatible with the one repeated and defended emphatically in 24–58 cannot seriously be disputed. Obviously Antiochus thus tried to force the Peripatos into the neighborhood of the Stoa, whereas from the point of view of Carneades Theophrastus defended that very doctrine that had successfully avoided the error committed by Epicurus and the Stoa.

In the course of the ensuing discussion (75–85) Cicero plays off the inner logic of the Stoic doctrine against the incompatibilities of the Peripatetic doctrine (of course without identifying himself with the Stoa). The thesis that the wise man is in full possession of happiness is incompatible with the three-goods-theory, since the physical and the social goods are exposed to all kinds of fortune over which even the wise man has no power. In one way only can that objection be met, and that is the very same way Epicurus used after Theophrastus (and probably under his influence) to obviate a corresponding objection. The statement that the wise man is always in possession of

happiness must not be understood in the sense of a rationally rigorous either-or, as the Stoa does in its reclusiveness from the real world. Even happiness is subject to the law of more-or-less and man will be content with a happiness where the good prevails over the bad. The main point is to value the whole *ex maxima parte* (92), and the Peripatetic does not hesitate to quote favorably Epicurus's *Kyr. dox.* 16 (as far as *ta megista kai kuriôtata*, cf. *De fin.* 4.15, 19, 27, 34, 60) which the Epicurean himself mentions in 1.62–3 and which the opponent hinted at in 2.57 and 89. The illustrating examples in 91 may well go back to Theophrastus himself: a field yields profit even if there are some weeds among the grain, and a business is successful in spite of minor losses. The sober realism of these examples fits in with our general image of Theophrastus; in Aristotle that is no more than hinted at.

That may suffice. It seems highly probable, if not certain, that Theophrastus's *On Happiness*—which is after all cited twice (5.12 and 85)—is on the major issues reliably excerpted in 5.24–59, for in 59–69 Theophrastus's ideas are also used, and again in 86 the beginning of the work is alluded to,⁷ and finally in 87–95 Theophrastus is used as well.

One may hesitate at 5.77, where Theophrastus is said to have discussed the influence of fortune, the significance of pain and torture, and to have said that all are able to destroy the happiness of the wise man (on that see again *EN* 1101a9–13). In 24–59 those conceptions were passed over. Might that be intentional, so as not to encumber Theophrastus's position unnecessarily, or should we rather suppose that a reminiscence of his *Callisthenes* is inserted here? Both views might be taken for possible, but the clinching matter is probably to be found in *Tusc. disp.* 5.24: according to that passage he argued in *On Happiness* that a human being cannot reach a state of blessedness under pain and torture. Cicero significantly adds that Theophrastus—though it had been maintained, probably by Stoic adversaries—nowhere spoke of *trochizesthai* (as did Aristotle, *EN* 1153b19–21, a passage that at the same time proves that a harshly rigorous ethical philosophy of the “Stoic” type must have been taught already before Aristotle).

The conclusion must be that our text takes into consideration so to say only the first half of *On Happiness*, i.e. the construction of happiness out of the nature of man, but not the second half, which must have discussed all the hardships blocking the road to happiness. We can easily imagine that the remarks in 90–5 formed the transition to that second part. Thus Aristotle, too, in *EN* 1101a8–13 speaks first of insignificant misfortunes that are not going to impair happiness and then of those great misfortunes from which—if ever—man can recover only painfully. Epicurus (1.49) registers that as the moment when it is commendable to leave life. Thereby he certainly goes beyond both Aristotle (cf. *EN* 1138a5–14) and Theophrastus.

We may end our study with a reference to the fundamental philosophical

problem that is present throughout the discussion of the *De finibus*. Both Epicurus and the Stoa present a breach in the evolution of man. A first period of unlimited interest in one's own life, of preservation and defense of that life, is contrasted with a second period in which something "entirely different" is being searched for, where, so to say, the ethical paradox arises. The tranquillity of *alupia* is precisely not what man will desire spontaneously, and *virtus* is the very "object" for which the wise man will sacrifice his own life. Theophrastus's biological ethics tries to do without such a breach. The *telos* of all action is innate in the nature of the infant and a continuous unproblematic evolution takes place between birth and the realization of all human abilities.

But that very lack of any problem necessarily becomes a problem in itself. First, an ethical system in which man has to accomplish nothing except what nature destines him for is, strictly speaking, no ethical system at all. For in order to commend man to do nothing but follow his innate inclinations, there is no need of an ethical system. Second, man also claims the right to act against his inclinations and to further another man's interest against his own or to realize a totally autonomous "object" or "idea." Theophrastus seems to ignore the conflict that arises there.

Connected with that is the further question where the phenomenon that Aristotle calls *mochthēria* originates. It is known that the Greek philosophers up to the time of Neo-Platonism surprisingly rarely thematized the problem of evil. For them evil seems to be hardly more than a particular aspect of the disorder that dominates the entire sublunar space. In our context one consequence should be stated: both the Epicurean and the Stoic ethics are able to explain the phenomenon of evil, the biologically principled ethical system of Theophrastus cannot. According to Epicurus, man becomes evil when he refuses to make the step from *hēdonē* as motion (that may continue endlessly) to the finiteness, finality and tranquillity of *alupia*. He becomes a victim of unsatiable *epithymia*, which ruins both the individual and his environment (1.43–4). Similarly for the Stoa: beside the wise man who lives virtuously there is the unwise man who succeeds in adhering to an average decency (cf. e.g. 3.59), but beyond both is the scoundrel who refuses (in Aristotelian terms) to dare the leap from living according to *pathos* to living according to *logos*. In that case self-preservation and self-defense, which every man begins with but must not end with, turn into a tyrannical and unrestrained defense of brutal self-interest. When from the Stoic perspective the philosopher Plato is contrasted with the tyrant Dionysius (4.56), and the same Plato is held up against the tyrant Phalaris (4.64), we perceive in the background the portrait of the tyrant as the most evil and most wretched of all men, such as Plato had established in the *Republic*. Doubtlessly the Stoa used this portrait as a contrast to its wise man.

Thus that man turns out evil who is not willing to make the leap which, in

both the Epicurean and the Stoic ethics, is in the long run constructive and the very hinge of ethical action. In Theophrastus's biologic ethics there is no room for such an aitiology of evil. Man could only become evil if he were incredibly unable or unwilling to know himself. That is doubtlessly the greatest rub of that ethical system, a substantial philosophical deficiency, even if it must have recommended itself to those readers who were inclined to believe in the goodwill and the decency of all men.

NOTES

1. Some good observations are to be found in C. Lévy, "La dialectique de Cicéron dans les livres II et IV du *De finibus*," *Revue des Études Latines* 62 (1984) 111–27.
2. In *De natura deorum* 2.37 Chrisippus comes so close to our text *De finibus* 2.40, that it has long been surmised that he was using the dialogue of Aristotle.
3. The idea of kinetic pleasure being the aim might be thought to be coherent as taught by Aristippus. See 1.23, 26 and 2.34, where the doctrine of Aristippus is played off against that of Epicurus.
4. In this context one may also refer to Aristotle's *Politics* 1278b24–30 and even add that there is a striking agreement between *De fin.* 5.30 and Arist., *EN* 1175a18–21; similarly between *De fin.* 1.23 and *EN* 1152b2.
5. On the term *philautia* (a term which does not occur in Plato) and on the subject itself see Arist., *EN* 9.4 and 8.
6. Might there be hidden in that a polemic against Democritus, who seems to have begun his cosmological work with the sentence: "Man is what we all know . . ." (*VS* 68B165)? That sentence can only mean that man need not be an object of further study; it is the world and the universe in its entirety which are unknown to us and need to be investigated.
7. Cicero in the *Hortensius* began his great speech with the same sentence, quoting maybe the Aristotelian *Protreptikos*, in which context *EN* 1095a17–20 may be mentioned.

The Origin of Greek Sacrifice: Theophrastus on Religion and Cultural History

Dirk Obbink

“The Greek rite of blood sacrifice is clearly objectionable,” wrote Walter Burkert over a decade ago, “and was felt to be so early on, because it so clearly and directly benefits man.”¹ To this effect, Burkert could cite the deception of Zeus by Prometheus in Hesiod,² the vegetarianism of Orphics and Pythagoreans,³ and the *Purifications* of Empedocles.⁴ But the only unambiguous support for this claim—aversion to animal sacrifice among the Greeks at large—came from Theophrastus’ influential book *On Piety* (*Peri eusebeias*) because it offered a general cultural and historical theory of Greek sacrifice from earliest times down to, and including, Theophrastus’ own day. Theophrastus, it is assumed, wrote what today might be called “anthropology” of religion, and conducted fieldwork in much the same way a modern researcher might. It is not the purpose of this paper to question the view of Theophrastus’ methods and intentions, but a closer examination of Theophrastus as a cultural historian in *On Piety* casts grave doubts on the use of Theophrastus as evidence of aversion to blood sacrifice. I begin with some general considerations regarding the preservation of Theophrastus’ *On Piety*, together with the uncollected fragments on religion,⁵ and their place in ancient writing on religion and cultural history. Next I present an overview of Theophrastus’ influential theory of the origin and development of Greek sacrifice. This exposition concentrates on issues of anthropology, cult, and cultural history (which have received much less attention in the secondary literature) though not of course totally to the neglect of the more familiar philosophical controversies involved. Finally I argue that the evidence offered by Theophrastus on the question of aversion to blood sacrifice—in historical times, at least—is exactly the opposite of what Burkert says.

Like many pagan philosophers critical of traditional religion, Theophrastus gained abiding credibility in later antiquity. His book *On Piety* was without question extremely influential, not only in ancient times (as the extensive extracts preserved by Porphyry and citations in Simplicius, Eusebius, Theodoretus,⁶ ancient lexis and scholia⁷ attest), but also for modern historians of religion as well. Jacob Bernays was the first to realize how closely Porphyry followed Theophrastus as a source in his treatise *On Abstinence*, and to collect the Theophrastean portions in a learned critical edition.⁸ As a result, Theophrastus' testimony for details of cult practice soon came to be highly rated.⁹ His general theory of the origin and development of Greek religion is reflected in the work of a whole school of study whose influence is still felt today.¹⁰ Since the work of Bernays, editors have tended to see more and more of Theophrastus in Porphyry's treatise. While it is likely that there is still more Theophrastus lurking in the treatise, a greater vigilance regarding the text is doubtlessly in order. In particular it is necessary to distinguish (through the use of a variety of editorial techniques) the passages that are reproduced verbally from Theophrastus¹¹ from those composed by Porphyry himself but which contain reminiscences of Theophrastus' theory and terminology.¹² It is also necessary to read the demonstrably Theophrastean passages more closely within the context they occur, informed by a consideration of Porphyry's own thought on a range of current neo-Platonic and neo-Pythagorean issues.¹³ For Porphyry, Theophrastus' critique provided the theoretical basis for a defense of neo-Pythagorean vegetarianism. Theophrastus' own purpose in *On Piety*—namely, to find the most appropriate way of honoring the gods—differs markedly. But Theophrastus' position on this question was such that the distinction does not (as Bernays thought it did) provide a consistently reliable criterion for distinguishing Porphyry from Theophrastus in *De Abstinence*. Such a criterion has yet to be established.

Of the structure of the work, nothing can be known with certainty. Diogenes Laertius (5.50) says it consisted of a single book; in the other citations of the work no book number is named. It has recently been suggested that it was a popular or exoteric work,¹⁴ that it was a dialogue,¹⁵ in which the participants set forth different versions of the origin and appropriateness of various sacrificial rites. Certainly in the portion preserved by Porphyry, Theophrastus was at pains to set forth the best possible case *against* animal sacrifice. Thus Burkert was certainly right to place the work squarely in the context of philosophical criticism of traditional religion,¹⁶ for it did contain a normative evaluation—on the basis of a Peripatetic concept of *oikeiōtēs* (as a relationship between men and beasts)—of the appropriateness of the sacrificial act.¹⁷ Strictly speaking, however, the book was a special application of Theophrastus' general theory of cultural history¹⁸ to religious development, in particular to sacrificial custom. Here Theophrastus followed such classical

predecessors as Prodicus and Critias¹⁹ in combining *Kulturgeschichte* (or what we might call historical anthropology) with criticism of traditional religion and contemporary social institutions (in this case Greek sacrifice).²⁰ That is to say, he defended the thesis that animal sacrifice was inappropriate as a form of veneration by adducing an historical, anthropological account of its origin as a religious custom. It is to this account, as preserved by Porphyry, that one must turn, not only for Theophrastus' general theory of cultural history, but for his philosophical grounds for condemning animal sacrifice as well.

THE ORIGIN OF SACRIFICE

In the extracts from *On Piety*, Theophrastus told²¹ how in earliest times men first sacrificed only such herbs and grass-like plants as were spontaneously produced by the earth. They burned these substances entirely as first fruits (*aparchai*)²² in honor of the gods:

(1) It seems that at some incalculable time in the distant past, a nation most learned of all others, as Theophrastus says, which inhabited the highly sacred region made by the Nile, first began to sacrifice (*thuein*) from their vestal hearth to the gods of heaven preliminary sacrifices (*aparchai*) not made of myrrh, or cassia and frankincense mixed with saffron; for these practices were instituted many generations later, when man, wandering in error in search of the necessities of life, with great labor and many tears, would offer drops of these substances as first fruits to the gods. (2) Thus they did not at first sacrifice these, but rather grass, which, as a kind of fine down of prolific nature, they plucked with their hands. For the earth gave birth to trees before animals, and long before trees, grass, which reproduces itself yearly; and gathering the blades and roots and all its shoots, they burned them up completely, thus paying tribute to the visible gods of heaven by this sacrifice (*thusia*) and making immortal such honors for them with the help of fire. *De Abst.* 2.5.1–2

Here the “visible gods of heaven” (*tous phainomenous ouranious theous*) are the celestial bodies; that these are themselves gods is an idea independently attested for Theophrastus.²³

We learn further (2.5.2) that sacrificial offerings were originally rendered through fire, because “fire resembled these gods most.”²⁴ An etymological argument (*thuein* from *thumian*) is then adduced to show that burning as a sacrificial practice came before the killing of animals, which was totally unknown to the earliest men. In fact in Theophrastus' account, animals only appeared much later, after trees.²⁵ It is doubtful just how literally this chronology should be taken. Bernays defended the chronology on the grounds that the “first men” are in this context probably the survivors of an earlier catastrophe destroying all other animal and vegetable life.²⁶ Some men escape destruction, and the cycle begins anew with the advent of grasses, trees,

and so on. This would explain why Theophrastus began his account not at some absolute beginning, but at some unknown time (2.5.1 *anarithmos chronos*) in the distant past. One could never be certain exactly when this occurred; something similar may have occurred many times, or in different times at different places. This chronology may also figuratively reflect the teleological subordination of animals to man, as in Aristotle.²⁷

Already in this first stage a succession of sacrificial substances from grasses to trees, then cultivated crops, and finally animals is made explicit. After grasses, men began to sacrifice perfumes and spices. This element of additional complexity and luxury initially met with disapproval among men; wandering in error (2.5.1 *planēs*), mankind moved from simple to increasingly lavish and complex rituals. When at a somewhat later time the earth produced trees, their leaves and fruit were offered in sacrifice.

The emphasis in Theophrastus' account on the invention or discovery of individual customs is characteristic of ancient writing on the history of man.²⁸ Likewise the repeated transitions introducing successive stages and progression in time (e.g. 2.5.1 *prōton*, 2.5.6 *meta tauta*, 2.6.2 *hysteron de*, 2.27.3 *enteuthen oun metabainontes*), are conventional stylistic devices in ancient accounts of the origins of culture.²⁹ Theophrastus further groups these individual transitions into larger divisions based on radical innovations of benefit to mankind. The degree of pure speculation involved in all of this will be painfully obvious to anyone. Far less obvious is the polemical import of Theophrastus' account, both against rival theories of the origins of culture and against those philosophers who condemned speculative philosophy as useless.³⁰ Whether Theophrastus was right or wrong in his conclusions may turn out to be vastly less significant than the method by which he proceeded.

THE AGRICULTURAL STAGE

A second stage began with the discovery of cultivated grains, which were first sacrificed whole, and later, after the discovery of milling techniques, in the form of ground grains or meal:³¹

(1) But when after leguminous substances barley grains (*krithōn*) appeared as the first of the cereal fruits, the race of men first used them in the earliest sacrifices (*prōtas thusias*). (2) Later on, when men had broken and ground the grains into edible form, because the instruments (*organa*) of this process afforded a divine assistance to human life, they hid them away in a secret place and approached them as things of a sacred nature; as the food produced by the process of grinding became blessed (*makaristhentos*) in comparison with their previous food, they offered first fruits of it in fire to the gods. Therefore, even now at the consummation of animal sacrifices (*thuelōn*) we employ offerings that are bruised or ground, thereby attesting by our action to the extent of addition (*auxēsis*) [i.e. to ritual procedure] since the beginning of sacrifices, while not perceiving on

what account we do each thing. (3) Proceeding from this point, and being more abundantly supplied both with other fruits³² and wheat grains, cakes of meal (*pelanōn*) were first offered along with the rest as first fruits in sacrifices to the gods; many flowers were collected (for this purpose) and mingled with these was any such thing as appeared beautiful in life and suitable on account of its odor to divine sense. Of these, some were used as garlands and others committed to the fire, and when they had discovered the use of divine drops of wine (*theias stagonas*) and honey and finally of oil, they likewise sacrificed these as first fruits (*apērchonto*) to their sources the gods. *De Abst.* 2.6.1–3

The distinction between stages of veneration by means of spontaneously produced fruit, on the one hand, and later by means of cultivated produce, may be a direct reflection of Prodicus' two-stage theory of religious development. In this connection it is especially significant that in Theophrastus' second stage, cultivated grains, along with their instruments of production, were themselves regarded as blessed, "because they afforded a divine assistance to human life" (*De Abst.* 2.6.2).³³ Theophrastus followed Prodicus in identifying cultivated crops as the source of man's worship of the gods.³⁴ The transition from whole to ground grains explains current practice: "For this reason," says Theophrastus, "even now we use ground offerings (*thulēmasi*) at the consummation of animal sacrifices, thus attesting the extent of accretion [i.e. to ritual procedure] since the beginning of sacrifices, while not perceiving on what account we do each thing."³⁵

This remark reveals an important aspect of the method used by Theophrastus in constructing his cultural anthropology. By this admission, he sought to extrapolate an historical-causal explanation for contemporary religious phenomena (in this case the use of grains in blood sacrifice). Evolution (toward increasing complexity) in cultural practice is taken for granted; the original significance of most practices is now assumed to be imperfectly understood.³⁶ We offer *aparchai* of ground grains along with animal sacrifice; we do not quite understand why we do this, except that there must have been a time before animals were sacrificed when ground grains alone were offered. Before the discovery of milling, the simpler whole grains must have been used. Proceeding by some such line of reasoning, from ground grains men advanced to the offering of sacrificial cakes (2.6.3 *pelanōn*).

Theophrastus gives a detailed illustration of this method at *De Abst.* 2.7.1, where this account of the early stages of sacrifice is supported by a description of the (contemporary) Attic procession of Helios and the Horai, in which the various sacrificial substances under discussion (from raw earth to cooked mealcakes) are paraded in succession in honor of divinities regarded as instrumental in their production. According to Theophrastus' account, the sequence was as follows: soil,³⁷ grass, olive branches, pulse, oak, komaros fruit, barley, wheat, cakes of figs,³⁸ cakes of wheat and ground barley, sacrificial bread and a pot of cooked grains. At this stage of cultivated

agricultural production, we are told, libations of wine, honey, and oil were first offered to the divinities who were regarded as their sources (*tois aitiaiois theois*),³⁹ water alone having been used previously in libations: "when they had discovered the use of divine drops of wine and honey and finally of oil, they likewise sacrificed these to their sources the gods."⁴⁰ In this way Theophrastus explained the use of wineless libations (*nēphalioi spondai*),⁴¹ by positing a progression from simple to more advanced and sophisticated benefits to human life. Thus his theory of cultural development was an historical-causal one consisting of a very selective analysis of religious custom into primary and secondary elements—a method shared by more than one modern historian of Greek religion. His focus at this point upon change rather than continuity as the central explanatory feature in ritual practice is also striking: Imperfectly understood changes in ritual procedure are viewed as accounting for contemporary continuities and survivals.

Another noteworthy aspect of Theophrastus' theory is its explanatory range. There is a distinct attempt to account for the existence of the great diversity of ritual forms in Greek religion. Each stage in the evolution of ritual procedure is partially retained in subsequent stages, and continues to be reenacted side by side with newer, more complex forms of veneration.⁴² As such, this constitutes a practical or functional kind of explanation. On the other hand, individual rites are viewed as not having any distinctive ideological connotation, but indicative only of contemporary levels of complexity in procedure. Particular rituals do not *mean* anything, though when compared with other rituals they are supposed to say something about the cultural past.

FROM HUMAN TO ANIMAL SACRIFICE: THE SUBSTITUTION THEORY

Animal sacrifice, finally, was a tertiary development; a more complex accretion to the stage of veneration of the gods by means of offering such agricultural produce as was seen to benefit human life. It was as a result of famine, says Theophrastus,⁴³ that in the absence of food men were reduced to eating their own kind.⁴⁴ Once they had derived sustenance from such cannibalism, they began to offer human victims to the gods. Finally, the bodies of other animals were substituted in sacrifice for those of men:⁴⁵

(1) Originally sacrifices of fruits (*tôn karpōn thusiai*) were made to the gods. But in time, when men became negligent of sanctity and, because of the scarcity of fruits and legitimate forms of food, came to the point where they were forced to eat one another, they then supplicated the divinity with many prayers and first made offerings of themselves to the gods, not only consecrating to the gods whatever among their own possessions was most beautiful, but also offering up in addition those of their own⁴⁶ species. (2) Hence, even up to the present men commonly engage in human sacrifice, not only in Arcadia in the Lykaian rites,

and to Kronos at Carthage, but also regularly for the sake of remembering the ancient custom, they sprinkle their altars with the blood of their own species, even though their sense of piety excludes from their rites in purifications and by official decree anyone accused of human slaughter.

(3) Proceeding from this point they made the bodies of other animals take the place of their own in sacrifices; (4) and again, through satiety (*korōi*) of legitimate forms of food and becoming negligent of piety, they were led through gluttony (*aplēstias*) to leave nothing untasted nor undevoured. (5) And this is what now happens (*nun symbainei*) to all men with respect to nutriment from fruits (*ek tōn karpōn trophēn*): for when by the intake of them they have satisfied their essential need (*tēn anagkaian endeian*), then seeking an excess of satiety (*tou korou to peritton*) they strive after many things for food which are beyond the bounds of moderation (*sōphrosynēs*).

(6) Hence then, not wishing to dishonor the sacrifices offered to the gods, they were led on to taste (*geusasthai*) the animals they had sacrificed, and on account of the institution of this practice the eating of animals became an addition to men's nutriment derived from fruits. And since they originally sacrificed offerings of fruits to the gods and gladly after their pious offering tasted what they had offered, so also when they made offerings of animals they thought it was necessary to do the same, although their original form of piety had not dictated that they do things in this manner, but rather venerate each of the gods with fruits. *De Abst.* 2.27.1–6

A process of substitution here accounts for the institution of animal sacrifice, which stands as the culminating element in a progression from simple to increasingly more sumptuous means of veneration. A distinct normative judgement (from Theophrastus' contemporary point of view) is made at each stage, linking present with past. Thus at the introduction of animal sacrifice, Theophrastus breaks into a critical digression: "this is what now happens to all men with respect to nutriment from fruits: for when by the intake of them they have satisfied their essential need, then seeking an excess of satiety they strive after many things for food which are beyond the bounds of discretion."⁴⁷ Gottschalk regards this passage as an interpolation by Porphyry, because it appears to offer a completely different reason (i.e. surfeit or gluttony) for the killing of animals from that described in the succeeding sentence ("hence then, not wishing to dishonor the sacrifices offered to the gods, they were led on to taste the animals they had sacrificed . . .").⁴⁸ But that sentence speaks of animal sacrifices (2.27.6 *thumata*) and so must refer to a slightly later aspect of this stage, after men already began to consume and gain nourishment from the eating of animals. (It seems to indicate why men, having once gained nourishment from animals and offered them to the gods, continued to eat from those sacrifices, rather than simply offering animals whole to the gods while adopting some novel form of nourishment.) The critical digression, on the other hand, sets forth a general principle of human nature, observable at the present time and so, it is inferred, operative at each transitional stage of religious development. This principle is central to

Theophrastus' methodology in writing cultural history.⁴⁹ P.A. Meijer has isolated an important combination of motives here; namely, 1) an optimistic vision of the development of culture, with an interest in "inventions" (in the manner of Prodicus and Critias), combined with 2) a pessimistic outlook on progress with particular emphasis on religious development, or rather, degeneration. This pessimism (also found in the cultural history of Dicaearchus) distinguishes Theophrastus' thinking here both from Prodicus (whom in other respects Theophrastus followed), and from Aristotle.⁵⁰

More specifically, Theophrastus' account centers on the succession of forms of nourishment (*De Abst.* 2.27.1 *trophē*; 2.6.6 *biou*), one substituted for another in a progression toward increasingly complex and (ultimately) morally deleterious forms. Just as in the case of nourishment derived from crops, so also nourishment derived from cannibalism *in extremis* is rendered sacred for its alimentary value, and thus is offered to the gods in sacrifice. Similarly substitution of increasingly extravagant forms of nutriment accounts for change in ritual procedure.⁵¹ Henrichs notes that "cannibalism *in extremis* is by definition unrelated to human sacrifice, and human sacrifice does not normally involve anthropophagy in the Greek tradition."⁵² Theophrastus' theory, however, posited a clear connection between the two (in prehistorical times), namely nourishment. In this way he was able at once to account for the relative infrequency of human sacrifice as well as its alleged survivals in his own day. He distinguishes between the phase of consumption (e.g. anthropophagy) on the one hand, and the succeeding step in which offerings rendered sacred in this process (in this case human victims) are offered to the gods. Thus he makes cannibalism *in extremis* the source of human sacrifice and ultimately (by alimentary substitution) of animal sacrifice.⁵³ Like modern theorists, Theophrastus probably had no evidence that this prehistorical substitution had in fact occurred. Perhaps he extrapolated from famous historical instances of cannibalism *in extremis* (like the siege at Poteidaia, Thuc. 2.70), together with contemporary instances of (alleged) human sacrifice and rituals involving substitution of victims known from contemporary cult (see below on the *bouphonia*). It is significant that in the two instances of human sacrifice cited by Theophrastus—the Arcadian Lykaia and the sacrifices for Kronos at Carthage⁵⁴—he says nothing of anthropophagy. Presumably he was thinking of victims rendered whole to the divinities in question; perhaps he knew (as we now do) that the Carthaginian victims were burnt alive, i.e. a holocaust sacrifice. For Theophrastus, these contemporary instances represent a stage in which nutriment is derived from the eating of *animals*, and only imperfectly reflect prehistorical procedures in which human sacrifice was causally linked with cannibalism *in extremis*. It was not necessary for the Carthaginians to eat their babies (though perhaps he thought they once did so). Like Greeks, they ate the meat of animals.

This alimentary model accounts for the connection between cannibalism and cult, and characterizes Theophrastus' particular version of the substitution theory. There is every reason to think that it is distinctive of Theophrastus' own version of cultural history, if not original with him. Porphyry (who was not writing cultural history in *De Abstinencia*) was certainly not wedded to it,⁵⁵ so we have no reason to suspect undue interference on his part in those passages in which it is fully operative. As such it constitutes a kind of contextual criterion for distinguishing Porphyry from Theophrastus in *De Abstinencia*, though not of course an infallible one independent of source and linguistic analysis. In this light, two further instances may be considered: first, a passage which has been regarded as Theophrastus' own work by every editor and commentator on *On Piety*; and second, one which has been accepted by none.

THE ORIGIN OF ATHEISM

Theophrastus was aligned with Epicurus (against Prodicus, Democritus, Protagoras, Critias and Hellenistic skeptics) in holding that mankind at the very earliest stage of cultural development had believed in the existence of gods, and worshipped them (Prodicus and Democritus endowed mankind with such behavior at a very early stage, but Theophrastus even before the advent of plants and animals). There were, however, well known historical instances of *atheism* to be reckoned with, and for this reason it became necessary for those holding this position to account for the existence of nonbelief in the gods. Here Theophrastus linked his theory of the origin of animal sacrifice in a very economical and, I think, unnoticed way with an explanation for the rise of atheism.⁵⁶ When animal sacrifice was first introduced, some men, reviling the gods (*kakothēoi*) for taking honor from such dire practices, became atheists and sacrificed nothing at all, while others became maliciously envious of the sumptuousness of the honors accorded to the gods, and regarding the gods as subject to human passions, they resorted to even more unjustly extravagant sacrifices. With a rather original touch, both disbelief in the gods as well as false beliefs about their nature are viewed as a function of or reaction to the development of ritual procedure.⁵⁷

Bernays included this passage as a genuine fragment of Theophrastus because he could not find adequate grounds for supposing that it was Porphyry's insertion; he certainly offered no grounds for attributing it to Theophrastus. Its authenticity now seems to be beyond doubt, for surely it is the operation of Theophrastus' own theory of alimentary progression which is distinctive in this case. Porphyry certainly had no particular reason for dealing with the problem about atheism (which harks back to earlier Hellenistic

theological controversies), and even if he did, it is doubtful whether he could himself have put Theophrastus' theory to such good use.

PYTHAGORAS AND HUMAN SACRIFICE

After his account of the introduction of blood sacrifice,⁵⁸ Theophrastus quotes a famous passage of Empedocles, from the poem which Diels thought was called *Katharmoi*: in the Age of Aphrodite, "no altar was wet with the blood of bulls."⁵⁹ This leads him to describe the great altar of Apollo Genetor on Delos, on which in historical times no blood offerings⁶⁰ were made, and to conclude that those pious individuals who first established the altar did not yet perform blood sacrifice. Then appears a curious passage:

The Pythagoreans, having inherited this mode of sacrifice [i.e. bloodless], abstained from animal food throughout the whole of their lives. And whenever they came to distribute an animal victim to the gods as a sacrifice instead of themselves (*anth' heautōn*), they merely tasted (*geusamenoi monon*) of it, and lived in reality without touching the remaining parts [i.e. of the sacrificed animals]. *De Abst.* 2.28.2

These prehistorical Pythagoreans also appear at *De Abst.* 1.23, where Pythagoras himself is named as having persuaded men to abolish human sacrifice. But this tradition seems to be otherwise unknown.⁶¹ Bernays took the passage quoted above as Porphyry's own meddling with Theophrastus' account, and his judgement has been accepted by subsequent editors.⁶² I think, however, that it must have come from Theophrastus, precisely because it makes sense only in the context of Theophrastus' fully articulated theory of sacrificial substitution.

Bernays supposed that Theophrastus' description of the great altar at Delos caused Porphyry to recall the tradition that Pythagoras and his vegetarian followers made offerings there,⁶³ and so inserted these otherwise unattested details into Theophrastus' account. Unfortunately this does not accord with the text, which specifically says that the Delian altar was uncontaminated by blood sacrifice from the time of its foundation down to historical times. It is by no means clear from the text that the Pythagoreans are to be regarded as the founders of the Delian altar. Rather the story about them seems to be a separate piece of evidence, and in any case these Pythagoreans are specifically said to have originally performed animal sacrifices. That Porphyry could fabricate such an aberrant tale bearing directly upon a point for which there were distinct authoritative traditions to be followed is less than plausible.

On the other hand, the story has all the signs of being genuinely Theophrastean, for the distinct element here is the attempt to make the Pythagoreans,

notoriously vegetarian in one branch of the Hellenistic tradition, conform to the pattern of Theophrastus' substitution theory of sacrifice. Only in the context of that account is this otherwise unattested story about the Pythagoreans comprehensible: they are described as reaching the historical stage when they "came to distribute an animal victim to the gods instead of themselves" (*anth' heautōn*, cf. 2.55 *anti anthrōpou ton boun*), just as in Theophrastus' account, men "first began to make sacrifices of themselves (*sphōn autōn*) to the gods," by "making the bodies of other animals supply the place of their own in sacrifices."⁶⁴ In Theophrastus' discussion of animal substitution *geuesthai* is used repeatedly to denote the first tasting of sacrificial victims. Thus at 2.27.6 "they proceeded to taste the animals they had sacrificed, and as a result *zōiophagia* was added to the nourishment provided to men by fruits." In the case of the Pythagoreans, this latter practice was never fully acquired; after abandoning human sacrifice they "only tasted" (*geusamenoi monon*) of animal sacrifices, and then stopped.⁶⁵

The story about the Pythagoreans may have been intended to explain why according to one tradition (e.g. Aristoxenus) Pythagoras and his followers did or at least were thought to have included meat in their diet.⁶⁶ Theophrastus' own precise views on Pythagoras are unknown, but the present passage (with *De Abst.* 1.23), perhaps from a popular or exoteric context, speaks little for Pythagoras as an historical philosopher.⁶⁷ Like Aristotle, Theophrastus consistently avoided the name of Pythagoras in embarrassing contexts in his histories of philosophy. He names Anaximander and Xenophanes as the teachers of Empedocles, where the later tradition speaks of Pythagoras or Pythagoreans.⁶⁸ Likewise the post-Aristotelian tradition knows Pythagoras as the discoverer of the spherical earth; Theophrastus however said it was Parmenides.⁶⁹ The discussion of Pythagoras and human sacrifice, derived as it seems from *On Piety*, like the remarkably coincidental silence about Pythagoras in these passages, casts doubt on Theophrastus' view of his status as an historical philosopher and mathematician.⁷⁰

HONORING THE GODS

On the basis of remarks culled from these critical contexts, we are also in a position to say something about Theophrastus' positive view of piety. Certainly one of the most significant contributions of *On Piety* for the understanding of philosophical views on ancient religion is the division of reasons offered for why men sacrifice to the gods:

There are altogether three reasons why we sacrifice to the gods: to show them honor (*dia timēn*), to give them thanks (*dia charin*), or to express our need for some benefit (*dia chreian*). Just as though we were dealing with good men (*agathois andrasin*), so we consider that it is necessary to give first fruits to the

gods. We honor the gods while trying to turn aside misfortune or obtain benefits for ourselves or when we have already been well treated by them or simply through appreciation of their favorable disposition toward us. *De Abst.* 2.24.1

This division describes ancient views on religious observance on the model of sacrifice as giftgiving, and as such constitutes what is sometimes termed a 'functionalist' approach to religion. Sacrifices are viewed as honors (*timai*) accorded to the gods as a result of which they were favorably disposed (*hilaoi*) to men. According to Theophrastus, it is in this relationship that piety consists, and as a positive expression of such piety Theophrastus was content, like the "earliest men," with a modest offering at meals accompanied by a "pure" disposition (*De Abst.* 2.19.4–5). From a positive point of view, Theophrastus' view of piety was very close to the definition of piety at [Arist.] *VV* 1250b22 which makes piety a component of justice, first toward the gods, then toward other humans, and so on.⁷¹ This definition was backed up by a positive claim for a natural kinship (*oikeiotēs*) between humans and animals, resulting from the presence of similar biological needs, feelings and perceptions in all men and animals who are thus *oikeioi* to one another.⁷² Only in cases where this relationship does not obtain, argued Theophrastus, (i.e. useless or wild and damaging animals) should animals be killed.⁷³ But such animals would be unfit objects for sacrifice because they are not "perfect" and hence unacceptable as divine honors.⁷⁴ If Pötscher's new fragment 8 (*De Abst.* 2.59.1–61.6) is indeed from, or at least distinctly reminiscent of, Theophrastus, we may add the claim that the best offerings to the gods are a *nous katharos kai psyche apathēs*, "pure hearts" (Huby), but that material offerings in moderation are also "suitable" (*oikeion*).⁷⁵ If this is Theophrastus speaking, it is hard to see why the Theophrastean concept of *oikeiotēs* should not be brought to bear on this; but doubts remain.⁷⁶ From demonstrably Theophrastean passages we may safely say that the ideal sketched in *On Piety* was that of consistent or "continuous" piety (*synechēs eusebeia*),⁷⁷ and that this was regarded as dependent upon the mental disposition of the worshipper.

THE AETIOLOGY OF RITUAL: ANCIENT AND MODERN MYTHS

Throughout his account of the origin of Greek sacrifice, Theophrastus related at intervals various *mythoi* which had come to be told in explanation of the "invention" of particular sacrificial rites.⁷⁸ The occurrence of these tales can be explained⁷⁹ by Theophrastus' apparent attempt to weave individual "inventions" (like those randomly catalogued in such works as *On Discoveries*) into a coherent theoretical account.⁸⁰ All of these tales are set in prehistorical times, for the events they narrate occurred either before or at the time of the

institution of animal sacrifice,⁸¹ though many of the rites whose origins they purport to explain were still regularly performed in Athens in Theophrastus' own day. The most extended story of this sort in *On Piety* is the *aition* narrated for the prehistorical institution of the Attic *bouphonia*,⁸² the "ox-slaying" for "Zeus of the city" (*Dii Poliei*) which was performed on the fourteenth day of Skirophorion in midsummer, at the altar of Zeus on the highest spot of the Athenian acropolis. The details are relatively well known: a plow ox disturbs some sacrificial cakes and grains and is slain by an enraged plowman. The plowman flees the city in fear. A famine ensues, the Pythia is consulted, and the exile recalled. He persuades the citizens (through an interpretation of the oracle) to absolve the curse by participating in common in the slaying and eating of an ox. We are further told that this prehistorical event came to be ritually reenacted as the Attic *bouphonia*, which involved the sacrifice of a plow ox, accusations of guilt for its death (resulting in the condemnation and expulsion from the city of the sacrificial knife), and the ritual reerection of the figure of the slain ox yoked to a plow.

Fortunately the details of Theophrastus' account of the rite and its aetiology are corroborated by other ancient authors⁸³ and by the representation of the rite in Attic vase painting.⁸⁴ As a result of this testimony, Theophrastus' description of the bizarre rite has been made to stand as evidence in, if not the basis of, nearly every modern discussion of sacrificial practice. The differing interpretations of his description of the rite—each more fantastic than the next⁸⁵—cannot be discussed here. It cannot be emphasized strongly enough, however, that this rite (in particular the sacrifice of a domestic draught animal) appears to be unique and is without question aberrant in Greek sacrificial procedure. Hence those interpretations which seek to make all of Greek sacrifice conform to the pattern of the *bouphonia* as a 'typical' model must be virtually rejected out of hand. The sacrifice of the plow ox—normally a prohibited victim—is set off as a special sacrificial event, perhaps evocative of 'powerful actions' on the part of worshippers. This aberrant aspect is fully in keeping with Theophrastus' view of the development of sacrifice as proceeding through a sequence of increasingly novel forms. Theophrastus was clearly attempting to isolate such deviations from normal procedure (so also libations of water from those of wine, animal sacrifice from modest material or agricultural offerings, human sacrifice from animal sacrifice). His description of the *bouphonia* is a good illustration of the fact that he found these variations imbedded in contemporary cult practices.

Theophrastus probably intended both the aetiological story and the description of the rite to illustrate his theory of the origin of blood sacrifice. Consideration of his account in close conjunction with that theory helps to shed light on some of the newer theories. Thus the central element in his account may not be the 'murder' of the plow ox (on which most modern

theorists center), but rather the substitution of an animal for a human victim (or for the vegetable offerings disturbed by the ox), and the subsequent eating of it; for according to his theory (*De Abst.* 2.6, 2.27) it is initially benefit to mankind, especially nourishment (as discussed above) which renders offerings suitable to the gods, while the need for more nutriment accounts for the transition to more complex and novel forms of offering. So also in Theophrastus' description of the *bouphonia*, it is famine (*De Abst.* 2.29.3 *akarpias*) which commends the initial slaughter of the ox to men, and eating of the ox which is approved by the Pythia. This is further effected through the substitution of the ox for a human victim. The original slayer of the ox, condemned for killing a domestic draught animal, man's principal ally in the production of nonanimal food,⁸⁶ thus escapes punishment for impiety (*De Abst.* 2.29.2 *aramenos hōs ēsebēkōs*) by persuading the citizens to engage in the common slaughter and eating of an animal victim (2.29.4).

Theophrastus was clearly attracted to the tale because it suited his contention that the development of sacrificial forms entailed religious and cultural degeneration. In keeping with this view, the *mythos* of the *bouphonia* provided a graphic illustration of a particular prehistorical stage in cultural history. Theophrastus' account leaves no doubt that at the time of its institution, animal sacrifice was regarded as objectionable and that this involved an element of guilt or remorse. But the claim with which we began—that Theophrastus' *On Piety* demonstrates a strong aversion to animal sacrifice in historical times—cannot be borne out. To be sure, Theophrastus argued in *On Piety* that on grounds of natural kinship one *should* feel aversion to blood sacrifice; perhaps he himself did. But the account of cultural history presented in *On Piety* in fact points in a different direction; namely that unlike the "earliest men," people by Theophrastus' time no longer felt any strong aversion to blood sacrifice, guilt for ritual murder, or remorse for sacrificial victims.⁸⁷ Rather, the terse social and philosophical criticism in *On Piety* is clearly directed toward a stage of contemporary culture which took for granted the legitimacy of that practice. The thesis of the treatise and most of its arguments would be pointless before an audience which already broadly regarded animal sacrifice as objectionable, or which could be expected to respond to the dim reflections of such aversion from a prehistorical past. Hence in the treatise as preserved Theophrastus cites no single historical instance of aversion or abstention from blood sacrifice. It seems likely that in his view there were none to be named,⁸⁸ for such instances as he might have used he treated in an entirely different way in his theory of cultural development. Ritual forms prescribing abstinence from animal sacrifice (e.g. vegetable offerings, prohibition of the ox as a sacrificial victim, etc.) he regarded as imperfectly understood survivals from prehistorical times. Empedocles' prohibition of animal sacrifice is quoted⁸⁹ as expounding a theory of cultural

degeneration virtually identical to that of Theophrastus itself, in which contemporaries have no compunction against the slaughter of animals. And contemporary Pythagoreans, standard examples in other accounts, will certainly not suit: according to the tradition followed in *On Piety*, they had once been cannibals.⁹⁰

NOTES

Versions of this paper were read at Stanford, Oxford and the Institute of Classical Studies, London. I am grateful for observations and criticisms to members of the audiences on those occasions and to those individuals who kindly responded to my queries, especially W.W. Fortenbaugh, David Furley, H. B. Gottschalk, Fritz Graf, Albert Henrichs, Michael Jameson and Simon Price.

1. *Homo Necans: The Anthropology of Ancient Greek Sacrificial Ritual and Myth* (Berlin 1972), Eng. transl. (Berkeley 1983) 7f and 138 (on Theophrastus), which portrays animal sacrifice as ritual murder; men feel primitive guilt and remorse for victims and seek to make symbolic reparation through the sacrificial act.
2. Hes. *Theog.* 533ff., concerning the division of sacrificial parts. The theme (which became a standard joke in Greek comedy) that the gods get *cheated* in sacrifice is of an entirely different order from the philosophical criticism, according to which the size of the sacrifice (and thus of the gods' portion) as a rule does not matter.
3. Orphics: Eur. fr. 742 N²; Pythagoreans: Theophr. ap. Porph. *De Abst.* 2.28.2, Iambl. *Vit. Pyth.* 82.
4. VS 31 B 128 and 136–39 D.–K.; Lucretius 5.1198–1202 may be added in this connection.
5. A new edition of Theophrastus' *On Piety* and the major fragments on religion and *Kulturgeschichte*, together with full commentary, is currently in preparation as part of Project Theophrastus.
6. Simplic. *In Epict. Ench.* 222C–23A; Euseb. *Praep. ev.* (citing Theophrastus, though probably from Porphyry) 1.9.7–11, 4.14.1–7, 4.16.10, 9.2.1; Theodoretus *Graec. affect. cur.* (from Eusebius) 7.38–41.
7. Photius *Lexicon* s.v. *kurbeis*; schol. in Aristoph. *Aves* 1354; schol. in Pindar *Pyth.* 2.2. An Egyptian papyrus dating from the third century B.C. (*P. Petrie* II 49e = 2593 Pack²) contains what is arguably the remains of Theophrastus *On Piety*: see C. Gorteman, *Chronique d'Égypte* 33 (1958) 79–101. Recently A. Henrichs, *GRBS* 13 (1972) 94–97 showed that Philodemus' *De Pietate* contains a citation from Theophrastus' treatise entitled *Praises of Gods*. Also attested for Theophrastus are the treatises *On the Gods* (in three books) and an *On Festivals*, together with several other works dealing exclusively with religion. Many of the fragments from Theophrastus' *On Discoveries* and the *Robe* (i.e. 'miscellanies') contain material on cultural history relating to religion: see especially schol. in Hom. *Il.* 1.449 (repeated from *On Piety*) on the origin of the use of whole grains in sacrifice.
8. J. Bernays, *Theophrastus Schrift über Frömmigkeit* (Berlin 1866). Bernays drew on earlier work by A. Nauck, *Porphyrius, Opuscula Selecta*, ed. 2 (Leipzig 1886). More recent attempts to extract Theophrastus from the text of Porphyry: W. Pötscher, *Theophrastus, Peri eusebeias*, *Philosophia Antiqua* 11 (Leiden 1964); W.W. Fortenbaugh, *Quellen zur Ethik Theophrasts*, *Studien zur antiken Philosophie* 12 (Amsterdam 1984) 54–65 (text) and 262–74 (commentary). I refer throughout to the text of Theophrastus' *On Piety* by the chapter and section numbers of Porphyry's *De*

Abstinencia. For a table of equivalences between this numbering, the pagination of Nauck², and the numbering of fragments by Bernays and Pötscher, see Fortenbaugh, *op. cit.*, 264.

9. Theophrastus' *On Piety* contains what is arguably the most extended and detailed account of a Greek sacrifice, the Attic *bouphonia* (Dipolieia, 14th Skirophorion), which has now assumed the status of a minor Homeric question in modern scholarship on Greek religion. See below, pp. 283–86 with nn. 78–87.
10. From a purely theoretical viewpoint, Theophrastus' emphasis upon development from primitive to more advanced stages of religious practice had great affinity with and a certain formative influence upon modern theories of the origin of Greek religion, in particular those of Jane Harrison and the Cambridge School (e.g. Gilbert Murray, F.M. Cornford, A.B. Cook). More recently Walter Burkert and Fritz Graf have argued in part against the primitivism of the Cambridge School with special reference to Theophrastus' procedure. The concept of evolution in religion inherited by the Cambridge School has its origin in the Romantic view of history which was first applied to Greek religion by C. G. Heyne, F. Creuzer, K. O. Müller and others who had earlier drawn upon Theophrastus, at least indirectly (via Porphyry); cf. Burkert, *Homo Necans* (above, n. 1) 138. (I am indebted to A. Henrichs for advice on this point.)
11. *De Abst.* 2.5.1–9.2; 11.3–15.3; 19.4–31.1; 31.7–32.2; in part 59.1–61.2 (fr. 8 Pötscher). On the text, see most recently Fortenbaugh (above, n. 8); *Porphyre De l'abstinence livres 2–3*, eds. J. Bouffartigue and M. Pattillon, tome II (Paris 1979). Especially useful for readings since Nauck and Bernays are Ths. Achelis, "Theophrastus, De Pietate," *CQ* 5 (1911) 236 f, Bouffartigue (above), and H. B. Gottschalk's review of Pötscher (above, n. 8) in *Gnomon* 41 (1969) 338–44. I follow Fortenbaugh in regarding *De Abst.* 19.4–31.1 as a single block of Theophrastean text, and 59.1–61.2 (fr. 8 Pötscher) as Porphyry's own composition contaminated with reminiscences of Theophrastus.
12. Current debate centers on Pötscher's new fragment 8 (*De Abst.* 2.59.1–61.6) which Eusebius (carelessly?) cites from Theophrastus. See Pötscher, ed.; Gottschalk's review of Pötscher, 340f. and 342, P.M. Huby, *CR* 23 (1973) 52–4.
13. See F. Romano, *Porfirio di Tiro. Filosofia e cultura nel III secolo D.C.* (Catania 1979); A. Preus, "Biological Theory in Porphyry's *De abstinencia*," *Ancient Philosophy* 3 (1983) 149–59.
14. W. Pötscher, *Strukturprobleme der aristotelischen und theophrastischen Gottesvorstellung*, *Philosophia Antiqua* 19 (Leiden 1970) 75–147. Cf. Fortenbaugh (above, n. 8) 273.
15. Gottschalk, review of Pötscher (above, n. 11) 344. The dialogues attributed to Heraclides Ponticus may be compared in this respect, for which see H.B. Gottschalk, *Heraclides of Pontus* (Oxford 1980) esp. 6–12.
16. In general, the critical aspect of the work (see esp. *De Abst.* 2.25.1–7) has been neglected, as against its value as a source for Peripatetic theology and for religious custom; see P. Decharme, *La critique des traditions religieuses chez les grecs* (Paris 1904, repr. Brussels 1966); D. Babut, *La religion des philosophes grecs* (Paris 1974) 131–33; P.A. Meijer, "Philosophers, Intellectuals and Religion in Hellas," in H.S. Versnel, ed., *Faith, Hope and Worship: Aspects of Religious Mentality in the Ancient World* (Leiden 1980) 216–63.
17. Theophrastus had good philosophical precedent for this kind of writing, which falls into the category of Greek monographs (*suggrammata*) called "peri-literatur" by F. Leo, *Ausgewählte kleine Schriften* II, ed. E. Fraenkel (Roma 1960) 390 ff: a

treatise *Peri eusebeias* is attested already for Pythagoras, a *Peri theōn* for Protagoras; Plato's *Euthyphro* passed in antiquity as *Peri hosiotēs*, while the second *Alcibiades* is concerned largely with prayer. So Aristotle wrote a *Peri eusebeias*; Theophrastus' successor Strato of Lampsacus wrote a *Peri theōn*. Such works—notoriously critical of traditional Greek religion—underwent a proliferation in the early Hellenistic period: e.g. Heraclides Ponticus, *Peri eusebeias*; Euhemerus' *Sacred History*; Damachus of Plataia, *Peri eusebeias* (FHG 2.44lf, Plut. *Lys.* 12.439C–440A); Philodemus' *Peri eusebeias* (adapted by Cicero in *De nat. decor* 1) and *Peri theōn* (paraphrasing Epicurus' works of the same names). Philodemus read and cited the treatises *Peri theōn* by Chrysippus, Persaeus, and Diogenes of Babylon. Even in the mythological (Apollodorus of Athens, *Peri theōn*) and periegetical writers an element of rationalism prevails (in the historians one may compare Diodorus' use of Euhemerus and Dionysius Scutobrachion).

18. Theophrastus also wrote *On Discoveries* (Diog. Laer. *Vitae* 5.47 *Peri heurēmātōn*) from which a handful of citations survives. On this tradition, see the treatises of the same name by Ephorus (FGrH 70 T 33d; F 205, F 104–6), Heraclides Ponticus (fr. 152 Wehrli), and Strato of Lampsacus (fr. 144–47 Wehrli). The fragments of Theophrastus' *Peri historias*, *Nomothetōn*, and *Peplos* also concern themselves with cultural history and points of anthropological development. The *Peri heurēsēs* attested for Theophrastus was probably a rhetorical work (i.e. *De inventione*), though we might have expected a separate entry for it in Diogenes list.
19. See A. Henrichs, "The Sophists and Hellenistic Religion: Prodicus as the Spiritual Father of the Isis Aretalogies," *HSCP* 88 (1984) 143 with n. 14; Meijer (above, n. 16) 252. This combination of *Kulturgeschichte* and *Götterkritik* is likewise evident in the historical anthropology of Epicurus (especially *Peri physeōs* Book 12).
20. On the importance of animal sacrifice as an institution in Greek society see Burkert, *Homo Necans* (above, n. 1) 9 f.
21. *De Abst.* 2.5.1–2: *hōs phēsi Theophrastos*. For an instance of what is a demonstrably direct quotation of Theophrastus' own words, see also 2.20.3: *Theophrastos . . . exēgeitai touton ton tropon ktl.* At 2.32.2 Porphyry refers to Theophrastus' main arguments (*ta kephalaia*) as being concerned with *tou mē dein thuein zōa*, which may reflect a chapter heading or *thesis* from Theophrastus' *On Piety*.
22. A slight contradiction, as *aparchai* are normally regarded as part offerings. In general Theophrastus fails to distinguish between whole and part offerings; he seems to have regarded *aparchai* as a kind of *thusia* in miniature, *thusia* as a big part offering.
23. Cic. *De nat. deor.* 1.13.35 (from Philod. *De Piet.* or a common source): (*Theophrastus*) . . . *divinum tribuit principatum . . . signis sideribus caelestibus*; Clem. Alex. *Protr.* 5.66.5. Aristotle on occasion had called the celestial bodies "(most) divine" out of larger classes of objects, but never explicitly attributes divinity to them or calls them gods. On Theophrastus' divergence on this point, see Bernays (above, n. 8) 44 and 128; Pötscher, *Strukturprobleme* (above, n. 14) 32–65, 79ff; Bouffartigue (above, n. 11) 212f; K. Gaiser, *Theophrast in Assos. Zur Entwicklung der Naturwissenschaft zwischen Akademie und Peripatos*, Abhandl. d. Heidelb. Akad. d. Wiss., Phil.-hist. Kl. 1985, 3 (Heidelberg 1985) 78ff, who does not consider the evidence of *On Piety* in this connection. For a roughly parallel instance, see Arist. *Peri philosophias* fr. 18 Rose², where the sky is called "the great visible god" containing the sun, moon, planets and stars.
24. Compare *De Abst.* 2.32.2, where worship is attributed to the gods' being *sunaitioi* (of benefits to mankind), apparently a complementary explanation.

25. *De Abst.* 2.5.2. On the problem and the Aristotelian view of the eternity of the world and of man, see E. Zeller, "Über der Lehre des Aristoteles von der Ewigkeit der Welt," *Abh. d. königl. Akad. d. Wiss.*, Philos.-hist. Kl. 1878, 97–109; J.B. McDiarmid, "Theophrastus on the Eternity of the World," *TAPA* 71 (1940) 239–247. On the question of spontaneous generation of animals and plants, see E.S. McCartney, "Spontaneous Generation and Kindred Notions in Antiquity," *TAPA* 51 (1920) 101–115; Fortenbaugh (above, n. 8) 272 and the literature cited there.
26. Cf. Arist. *Pol.* 2.8 1269a4, *Met.* 9.8 1074b10, *Plat. Leg.* 3 677A–78D; Bernays (above, n. 8) 44–52. Note that Theophrastus does not begin his account with the *prōtoi anthrōpoi* familiar from other anthropological accounts.
27. See e.g. *Pol.* 1256b15. Fortenbaugh (above, n. 8) 273 regards the chronology as a matter of "fingierte Priorität" appropriate to a dialogue or exoteric work.
28. For a brief review of alternate theories of cultural history in antiquity, see T. Cole, *Democritus and the Sources of Greek Anthropology* (American Philological Association 1967) 47–59. More detailed treatments: E.E. Sikes, *The Anthropology of the Greeks* (Cambridge 1914); A. Kleingünther, *Prōtos Heuretēs*, *Philologus* Suppl. 26.1 (Leipzig 1933); W. Spoerri, *Späthellenistische Berichte über Welt, Kultur und Götter*, Schweiz. Beir. zur Altertumswiss. 9 (Basel 1959); K. Thraede, "Erfinder," *RAC* 5 (1962) 1191–1278.
29. See A. Henrichs, *HSCPh* 79 (1975) 117 with n. 86.
30. For the latter point, see Cole (above, n. 28) 53 with n. 18. A good example of the former is Plato's polemic in the *Laws* and *Epinomis* with Isocrates (among others) over the purpose and value of writing cultural history, on which see B. Einarson, *TAPA* 67 (1936) 264–72, 282–84.
31. Cf. schol. in Hom. *Il.* 1.449, from Theophrastus' *On Discoveries* (see above, n. 7).
32. Retaining *karpōn* of the manuscripts against Bernays's conjecture *krithōn*.
33. Compare Prodicus *VS* 84 B 5 D.–K. (Sext. Emp. *Adv. math.* 9.18) *panta ta ōphelounta ton bion hēmōn*. W. Jaeger, *Diocles von Karystos* (Berlin 1938) 123–32 argued on the basis of alleged parallels with Book I of Diodorus that Theophrastus used Hecataeus' *Aegyptiaca* for his account in *On Piety* (followed by Cole, *op. cit.* 159f with n. 35). In fact the two accounts could hardly be more divergent, since in Diodorus (1.14.1) cannibalism *precedes* the discovery of grain by Isis (= Demeter). Perhaps the closest parallel is that in Theophrastus the Egyptians (as the oldest race) originally sacrificed to the *ouranioi theoi*, in Diodorus to the sun and the moon. Yet in Prodicus *VS* 84 B 5 the sun and moon are likewise principally named as among those elements qualifying for divinization because they aided and sustained human life (cf. Cole 156 with n. 26).
34. Noted by Henrichs (above, n. 19) 142. Theophrastus' account contains a veiled *aition* for the use of secret cult objects in the Eleusinian mysteries: *De Abst.* 2.6.2 "they hid them [sc. the *organa* for producing grain] away in a secret place and approached them as things of a sacred nature" (also from Prodicus?).
35. *De Abst.* 2.6.2.
36. A similar method underlies the use of arguments from etymology: original meanings can be inferred by assuming imperfectly understood changes in usage.
37. Reading *illus*, *poa* with Bouffartigue against the *eiluspoa* of the manuscripts, on the basis of Plut. *De esu carn.* 1.2 993F where *ilus* is described as a form of food used by the earliest men.
38. See Athen. 74D for fig cakes paraded in the procession at Plynteria as evidence for early forms of food; and Hesych. and Phot. s.v. *hēgētēria* (all from Theophrastus?).
39. Cf. *De Abst.* 2.32.3 *timan toutois hōn sunaitioi hēmin eisin*. Meijer (above, n. 16) 258 argues persuasively against Pötscher that mythological, not abstract astrologi-

cal divinities are meant here. The idea of successive stages divinizing first the grain itself (2.6.2 *makaristhentos*), and second their sources (the gods) is reminiscent of Prodicus. See above, n. 19 and Henrichs, *Cronache Ercolanesi* 6 (1976) 15–21 and *HSCP* 88 (1984) 139–58.

40. *De Abst.* 2.6.4; for libations of water see 2.20.3 and 30.1.
41. Theophrastus' explanation of wineless libations as a remnant of early sacrificial procedure (before the arrival of viticulture) was accepted by Jane Harrison, *Prolegomena to the Study of Greek Religion*, 3rd ed. (Cambridge 1922) 90–3 and 508 f.; in general she emphasized evolution from primitive to more advanced forms of religion. Harrison never in fact named Theophrastus, apparently unaware that he was Porphyry's source, nor did she connect the concept of evolution in ritual with any ancient source: cf. *Prolegomena* 90 n. 3 where a debt to earlier scholarship, itself inspired by Theophrastus, is indicated; cf. also above nn. 9, 10. Theophrastus' theory has recently come under attack by F. Graf, "Milch, Honig und Wein. Zum Verständnis der Libation im griechischen Ritual," in *Perennitas. Studi in honore di Angelo Brelich* (Rome 1980) 209–21 at 212 ff. Developing the ideas of Victor Turner and others, Graf regards wineless libations as ritual symbols which marked special "marginal" phases and transitions in the ritual process. See further A. Henrichs, "The 'Sobriety' of Oedipus: Sophocles OC 100 Misunderstood," *HSCP* 87 (1983), 87–100 at 97. Theophrastus shows no hint of the other conventional modern explanation of wineless libations as reserved mostly for the cult of "chthonian" or "fertility" gods. The primitivist interpretation may have recommended itself to Theophrastus because *nēphalia* tend to occur in conjunction with bloodless sacrifices (though not exclusively so): see Paus. 1.36.5; Henrichs, *op. cit.* 96 f.
42. For example, whole grain offerings side by side with ground meal and sacrificial cakes; libations of water, together with milk, honey and wine. Presumably for this reason Theophrastus acknowledged the possibility of human sacrifice existing in historical times side by side with the offering of *aloga zōia* (for his examples see *De Abst.* 2.27.2).
43. For the full chronological sequence, *De Abst.* 2.7.3 must be filled out by 2.27.1–7.
44. For a criticism of the substitution theory on the basis of doubts over the historical reality of human sacrifice among the Greeks, see A. Henrichs, "Human Sacrifice in Greek Religion: Three Case Studies," in Fondation Hardt, *Entretiens* 27, *Le Sacrifice dans l'Antiquité* (Vandoeuvres-Genève 1980) 195–235, especially 195–208. Henrichs established that no authentic eyewitness report of human sacrifice exists in all of Greek and Latin literature; entrenched ideas about substitution of animal for human victims in the poetic tradition (e.g. Iphigeneia in the *Kypria*, Eur. *IT* and *IA*, Ov. *Met.* 12.27–34) may exemplify not the prehistorical rejection of human sacrifice and its replacement with animal sacrifice, but rather reflect actual cult practices and contemporary ritual variations. On this view the substitution/rescue in the story of Iphigeneia, for example, would represent the more primitive version of the myth; the version in which Iphigeneia dies (Aesch. *Agam.*, Pind. *P.* 11, Lucretius) would instead represent a secondary development exploiting the moral and dramatic possibilities of the idea of human sacrifice. See further F. Graf, *Studi storico-religiosi* 2 (1978) 66; *Die antike Welt* 4 (1979) 33–41 esp. 37 ff.
45. *De Abst.* 2.27.1–3. The debate over the "substitution" theory of the origin of Greek sacrifice continues; see Henrichs, "Human Sacrifice" (see previous note) 195–208 with bibliography. Henrichs fails to mention Theophrastus in this

connection, though he is the earliest known and probably most influential exponent of the substitution theory. Other ancient expositions of the substitution theory: Pausanias 9.8,2; Aelian VA 12.34.

46. I supply *heautōn* after *genous*. The specification seems to be required (cf. 2.27.3 *tōn idion epoionto sōmatōn ta tōn loipōn zōiōn sōmata*: "they made the bodies of other animals take the place of *their own* bodies").
47. Compare Aristotle EN 7.1148b22–23, which names cannibalism and the eating of raw flesh as examples of the depravity of which human nature is capable.
48. Gottschalk, review of Pötscher (above, n. 11) 343 with n. 1; cf. contra: Fortenbaugh (above, n. 8) 266–67.
49. *De Abst.* 2.27.5. There may be here a hint of the operative principle which suggested to Theophrastus the theory of progression from simple to more complex sacrifices; namely, something approaching the theory that ontogeny (which of course includes the adult stage) recapitulates phylogeny. Since individuals proceed from relatively simple diets to more complex and varied food forms as adults, so (Theophrastus might have reasoned) did human cultures advance historically. Paradoxically, Theophrastus makes gluttony a vice, the cause of *abandoning* human sacrifice, and regards this transition as a sign of degeneration. But this will not have seemed strange to one whose position was approaching vegetarianism, on which see J. Haussleiter, *Der Vegetarismus in der Antike*, RGTV 24 (Berlin 1935), esp. 59–62, 237–45 on Theophrastus.
50. Meijer (above, n. 16) 252 with n. 111, who also notes that Theophrastus' adoption here of the idea of evolution in nature is in many respects un-Aristotelian.
51. One may contrast in this respect the Attic myth according to which Demeter, the inventress of cereal foods, abolished cannibalism by introducing grains and the art of cultivation—on which see Cole (above, n. 28) 103 f; F. Graf, *Eleusis und die orphische Dichtung Athens in vorhellenistischer Zeit* (Berlin and New York 1974) 37 ff, 160 ff, who notes a similar role for Isis in the Isis-aretologies. In Theophrastus' account this sequence is reversed: the agricultural stage precedes the eating of first human, then animal flesh, with "dire need" (*anagkaiā endeian*) being introduced as the catalyst.
52. Henrichs (above, n. 44) 232 n. 2, citing Porph. *De Abst.* 2.53–8 (not from Theophrastus); his observation pertains to human sacrifice under historical conditions and not among the early stages of mankind.
53. Cf. Henrichs (above, n. 44) esp. 204 who urges that "in order to do adequate justice to the complexities of the mythical and ritual traditions" connected with human sacrifice, "we should desist from seeing human sacrifice and animal substitution as two separate steps in a historical evolution which supposedly led from inhumanity to humanity in ritual matters." Theophrastus would be guilty of the first error, but not the second; this transition he regards as a further stage of degeneration (see above, n. 49).
54. The latter seems to be a clear-cut and undisputed case of human sacrifice. On the alleged sacrifices to Zeus Lykaios in Arcadia, see F. Schwenn, *Die Menschenopfer bei den Griechen und Römern*, RGTV 15,3 (Giessen 1915) 20–5; far more useful is Burkert, *Homo Necans* (above, n. 1) 84ff and Henrichs (above, n. 44) 224 f with n. 1. These two instances were the standard examples in ancient anthropology. See for example Plat. *Minos* 315C where they occur together. Carthaginian sacrifice of humans to Kronos is first mentioned by Sophocles (fr. 126 Radt).
55. In *De Abst.* 4, for example, Porphyry used a completely different theory of cultural history, that of Dicaearchus. Fortenbaugh (above, n. 8) 274 rightly emphasizes the

differences between the two accounts. Unlike Theophrastus, Dicaearchus centered on the utopian, Golden Age setting of the earliest men. Though Dicaearchus describes the transition from fruits produced spontaneously from the earth to the introduction of cultivated crops, he did not, like Theophrastus, make nourishment the source of cultural and religious development, or identify any unitary factor as responsible for the transition between stages. So also in *De Abst.* 1, Porphyry, drawing on Hermarchus, makes extensive critical use of the long-standing tradition of Epicurean *Kulturgeschichte*.

56. *De Abst.* 2.7.3.
57. Epicurus held a competing theory of the origin of atheism, for which see Philodemus, *De Piet.* p. 98 Gomperz (*P. Herc.* 1077 fr. 18, 1–12). Presumably Theophrastus meant that the *atheoi* and *kakophrones* of his own time correspond to the *athutoi* and *kakothutoi* of earlier times. In support of his own theory, Theophrastus adduced (*De Abst.* 2.8.1) a bit of anthropological lore concerning the historical incidence of atheism among the Thoes in Thrace; this account also appears in Simplicius, *In Epicteti Enchiridion* 222C–23A (from Theophrastus). As an example of *kakothutoi*, the Bassaroi appear prominently at *De Abst.* 2.8.3.
58. *De Abst.* 2.27.1–6, quoted above.
59. *De Abst.* 2.27.7 = Emped. VS 31 B 128 D.–K.
60. Nor fire, it might have been added (as Aristotle fr. 489 knew)—a minor point against Theophrastus' theory (*De Abst.* 2.5.2 *katekaion*) of the earliest burnt offerings.
61. It is not discussed by W. Burkert in his massive *Lore and Science in Ancient Pythagoreanism* (Cambridge 1972). For a characteristically novel interpretation of this tradition, see M. Détienne, *Dionysos mis à mort* (Paris 1977) 148. Compare also Ovid *Metam.* 15.60–142 (esp. 75–95) and 459–78 where animal sacrifice is interdicted as a form of human sacrifice by Pythagoras because of his doctrine of transmigration.
62. Bernays (above, n. 8) 119 f. Bouffartigue (above, n. 11) 95 appears to waver. Porphyry is known to have used Pythagorean material elsewhere in *De Abst.* 2 (see Bouffartigue, Notice 9–16). Fortenbaugh (above, n. 8) is more generous, insofar as he treats *De Abst.* 2.19.4–31.1 as a single block of Theophrastean text, but does not commit himself on this point.
63. See Diog. Laer. 8.13 (= Arist. fr. 489 Rose³); Iambl. *VP* 25 and 35 (see Pease on Cic. *De nat. deor.* 3.88 for additional references).
64. *De Abst.* 2.27.1 and 2.27.3: *thusias tôn idiôn epoioounto somatôn ta tôn loipôn zoôn sômata*.
65. Cf. *De Abst.* 2.21.3 *en kratiston euthus aposchesthai*. A. Henrichs points out to me that *geuesthai* (cf. *De Abst.* 2.30.1) is a technical term referring specifically to the eating of the *splaachmos* in sacrifice: see Schol. bT in Hom. *Il.* A 464; Men. *Samia* 403. It is used of human sacrifice at Plat. *Polit.* 565D; Plut. *De esu carn.* 1.7 996C (of the Titans who eat Dionysus Zagreus).
66. On this point the Pythagorean tradition is divided between *empsychôn apechesthai* (e.g. Porph. *VP* 36; Iambl. *VP* 54) on the one hand, and *dikaïotaton thuein* (e.g. Iambl. *VP* 82, 100; Diog. Laer. 8.12; *Anth. Pal.* 7.119). Aristoxenus (e.g. fr. 25, 28, 29) had argued early on that Pythagoras avoided eating only plow oxen and rams (cf. Arist. fr. 194 = Diog. Laer. 8.19 where *eniote* means “at certain times”). On the division in the sources see esp. Burkert, *Lore and Science* (above, n. 61) 180–83; *Homo Necans* (above, n. 1) 7 f, 258 n. 10.
67. See below, n. 81.

68. *Phys. op.* fr. 6, 6a, 3 in H. Diels, *Doxographi Graeci* (Berlin 1879) 482f, 477f, and contrast Diels, *op. cit.* 166.
69. Diog. Laer. 8.48 = Theophr. *Phys. op.* fr. 17 (Diels, *Dox. Graec.* 492, Parmen. VS 28 A 44 D.-K.); cf. Diog. Laer. 9.21 = Theophr. *Phys. op.* fr. 6a (Diels *Dox. Graec.* 482 with 166); for Pythagoras, Diog. Laer. 8.25.
70. See esp. Burkert, *Lore and Science* (above, n. 61) 216 and 304 (with documentation there), who argues persuasively that the account of the discovery of the spherical earth in Plat. *Phaedo* (97C, 108E) does not rule out the evidence of Theophrastus. On the already un-Aristotelian account of Pythagorean modality in Theophrastus' *Metaphysics*, see Burkert, *op. cit.*, 62.
71. Cf. the emphasis on justice and injustice (toward both gods and animals) in sacrifice at *De Abst.* 2.22.1–25.7. Clearly Theophrastus' conception of piety as justice extended to man's relationship with animals. Already Hesiod *Op.* 276ff denied to animals any share in *dikē*: see further West's note ad loc. (on Archil. fr. 94 Diehl) and below, n. 88 (on the Cynic view). On the Peripatetic definition of *eusebeia*, see also Gottschalk's review of Pötscher (above, n. 11) 342; Fortenbaugh (above, n. 8) 271.
72. *De Abst.* 2.22.2; cf. 3.25.1–3 (from Theophrastus but not, according to Pötscher, Ed. 95f and Fortenbaugh [above, n. 8] from *On Piety*) where we are told that the animal soul and the human soul share the same first principles and affections (*pathē*). The attribution of this passage to Theophrastus' treatise *On Piety* is defended by Bernays 98–100; U. Dierauer, *Tier und Mensch im Denken der Antike*, Studien zur antiken Philosophie 6 (Amsterdam 1977) 173–74; Patillon (above, n. 11) 150–51. It remains a point for dispute whether *oikeiotēs* as it appears in Theophrastus' *On Piety* is simply a biological fact or the feeling of kinship to which the former gives rise: see F. Dirlmeier, *Die Oikeiosis-Lehre Theophrasts*, *Philologus* Suppl. 30 (1937) 1–100; C.O. Brink, "Oikeiōsis and Oikeotēs, Theophrastus and Zeno on Nature in moral theory," *Phronesis* 1 (1955) 123–45; and the literature cited by Cole (above, n. 28) 136f with n. 20.
73. *De Abst.* 2.22.1–25.7. Compare Ovid *Metam.* 15.477 and especially 15.108–110 (an exact parallel).
74. *De Abst.* 2.23.1–2, based on the Aristotelian definition of a *hieron teleion* as a pure, unblemished victim: Arist. fr. 101 Rose³, Plut. *De def. orac.* 437A; schol. in Hom. *Il.* 1.66.
75. For a compelling criticism of Pötscher's attempt to corrolate the three forms of offering (material, *nous*, and *psychē*) with three classes of gods, see Meijer (above, n. 16) 256–59.
76. With *oikeion* here in connection with judgements about religious observance, cf. *P. Oxy.* 2.2154,3–4 (from a popular Epicurean work) [*t]o tēs physeōs [oi] keion*, and the parallels cited by Diels, *Sitz. Preuss. Akad.* (1916) 907 = *Kl. Schr.* (Darmstadt 1969) 309. I am not the only one to hear an Epicurean ring here (cf. Gottschalk, review of Pötscher [above, n. 11] 342). The problem here is that we may have to reckon with the influence of Theophrastus upon the early Epicureans on this point. Direct influence is demonstrable in the case of *De Abst.* 2.22.2 *oikeiotētos ousēs hēmin pros tous anthrōpous*; precisely the same formula occurs in a fragment of Hermarchus (ap. Porph. *De abst.* 1.7.1). See Bouffartigue (above, n. 11) 94 n. 6. The Epicurean treatise on religion, *P. Oxy.* 2.215 likewise contains striking lexical parallels with Theophrastus' *On Piety* (including Pötscher's fr. 8).
77. *De Abst.* 2.13.4, 2.14.3. The idea that the right intellectual attitude is a prerequisite for piety, and hence for any form of religious observance, was of course wide-

- spread. The image of *pura mens* to describe this occurs even as early as Heraclitus (22 B 69 D.-K.; cf. 22 B 14) and Xenophanes' symposium elegy (fr. 1 Diehl). See further R. Parker, *Miasma: Pollution and Purification in early Greek Religion* (Oxford 1983) esp. 322–27. It is to Theophrastus in this connection (*De Abst.* 2.19.5) that we owe the famous couplet inscribed above the portal of the temple of Asclepius at Epidaurus: "He who goes inside the sweet smelling temple must be pure (*hagnos*); purity is to have a pious mind (lit., to think *hosia*)."
78. *De Abst.* 2.9.1 *tôn kata meros par' Athenaios anaireseôn hai aitiaí*. Thus 2.9.1–10 (stories about the accidental first death of a domesticated animal, cf. Ovid *Metam.* 15.111ff.); 1.25, 2.9.1–10, 2.29.1 (approval by the Pythia at Delphi of the sacrifice of any animal offering itself to die, perhaps reflecting divinatory procedures for choosing sacrificial victims), cf. Plut. *De def. orac.* 437A–B (from Theophrastus?), schol. in Aristoph. *Pax* 960; stories about animals first killed accidentally or by persons enraged at some offense: 2.10.1, 2.29.1. The story about Pythagoras (2.27.2) may have constituted one such tale. So also the Thoes in Thrace illustrating the rise of atheism.
 79. Against the doubts of Gottschalk, (review of Pötscher above, n. 11) 344. Dr. Gottschalk points out to me that if *On Piety* was in fact in the form of a dialogue, different *mythoi* may have been related by different speakers in the dialogue. The treatises *On Piety* and *On Oracles* of Heraclides Ponticus contained similar such tales; see Gottschalk, *Heraclides* (above, n. 15) 94–6.
 80. See for example schol. in Hom. *Il.* 1.449 (from Theophrastus' *On Discoveries*) on whole grains in sacrifice, which appears in its proper chronological sequence in Theophrastus' cultural–historical account from *On Piety* (*De Abst.* 2.6.1).
 81. If I am right about Pythagoras (see above), he provides a *terminus post quem non* for Theophrastus' prehistory; for he comes in the transitional stage at the substitution of animal for human victims. But perhaps this is indicative rather of doubts about the historical and philosophical status of that shadowy figure.
 82. *De Abst.* 2.29.1–31.1. For modern scholarship on the *bouphonia* see Burkert, *Homo Necans* (above, n. 1) 136–43.
 83. For the *mythos*: schol. in Aristoph. *Nub.* 985 (= Androtian *FGrHist* F 16); Paus. 1.29.10; Porph. *De Abst.* 1.28.2, 2.11.1; Suda s.v. *Bouphonia* and *Thaulôn*; schol. in Hom. *Il.* 18.483. On the Attic rite: Paus. 1.24.4 and 1.28.10; Aelian. *VH* 8.3 (probably from Theophrastus); Hesych. s.v. *Boutypón*.
 84. By the Gela painter (ca. 510/480 B.C.): see A.B. Cook, *Zeus* III (Cambridge 1940) 581–82; G. Bakalakis, *AK* 12 (1969) 56–60.
 85. Most recently M.L. West, *The Orphic Poems* (Oxford 1983) 45–7.
 86. To kill a plow ox was a crime at Athens: Aelian *VH* 5.14; Columella 6 praef. 7; schol. in Hom. *Od.* 12.353. Cf. Aratus 131–132 and Ovid *Metam.* 15.120–142 (esp. the last two lines, which recall Aelian); 15.470.
 87. Cf. Aristoph. *Nubes* 985ff., which represents the Attic *bouphonia* as exemplifying already in the fifth century a type of mystifying religious rite so antiquated and obscure that no one understood any longer its function or significance.
 88. The vegetarianism and abstinence from (or compassion for) animals—marked out by the Cynics as superior examples for man—vaguely attested for Xenocrates (fr. 101 Heinze), Bion (F76 Kindstrand) and Polemon (Clem. Alex. *Strom.* 7.6.32.9) may be relevant to Theophrastus' case, for which see R. Heinze, *Xenokrates: Darstellung der Lehre und Sammlung der Fragmente* (Leipzig 1892) 151ff; Haussleiter (above, n. 49) 198ff (on Xenocrates) and 237ff (on Theophrastus, the teacher of Bion); J. K. Kindstrand, *Bion of Borysthenes*, Acta Universitatis Upsalien-

sis, *Studia Graeca Upsaliensia* (Uppsala 1976) 57 and 293 (on Bion F76). Haussleiter (above, n. 49) 198 points out that the vegetarianism of the Cynics was not a consistent one.

89. *VS* 31 B 128 from *De Abst.* 2.27.7.

90. As Porphyry points out, *De Abst.* 1.23.

John the Deacon, *On Hermogenes'* Concerning Method 5 (cod. Vat. Gr. 2228 f. 428^r v.25–428^v v.9)

William W. Fortenbaugh

In 1908 Hugo Rabe published portions of a commentary by John the Deacon on the pseudo-Hermogenic work *De methodo*.¹ One of these portions (on *De meth.* 5) names Theophrastus, and at first reading it appears to attribute a long quote to him. Closer reading, however, forces one to reconsider and possibly to conclude that we have almost no Theophrastean material. Since the Greek text itself involves difficulties I have studied a photo of the manuscript (cod. Vat. Gr. 2228 f. 428^r v.25–428^v v.9) and offer here the following text complete with critical apparatus and translation.²

“ἡ δὲ ἐπενθύμησις ἐστὶν ἐνθύμημα ἐπιφερόμενον. ὃ μὴ προστεθὲν
μὲν οὐ ποθεῖται, προστεθὲν δὲ τὸ πᾶν ὠφελεῖ.” ὀρίζεται κἀν-
ταῦθα τὴν ἐπενθύμησιν καὶ φησὶν εἶναι ταύτην ἐνθύμημα τοῖς
προτέροις νοήμασιν ἐπιφερόμενον, οὐπὲρ οὐ προστεθέντος μὲν
οὐ γίνεται ζήτησις, προστεθέντος δὲ μέγα τῷ λόγῳ ὄφελος. οἶον 5
φησὶν ἡ Σαπφώ ὅτι τὸ ἀποθυήσκειν κακόν· οἱ θεοὶ γὰρ οὕτω κε-
κρίκασιν· ἀπέθυησκον γὰρ ἄν, εἴπερ ἦν καλὸν τὸ ἀποθυήσκειν.
καὶ πάλιν· “οὐ δεῖ σε δημηγορεῖν· τὸ γὰρ δημηγορεῖν πρᾶγμα
σφαλερὸν καὶ ἐπίφθονον. εἰ μὲν οὖν τὰ δίκαια λέγεις, οἱ
ἄνθρωποι σε μισήσουσιν, εἰ δὲ τὰ ἄδικα, οἱ θεοί.” καὶ πάλιν 10

1–2 *Hermogenes, De methodo* 5 (*RhGr t.* 6 p. 418.15–17 Rabe); *lemmatis partes inveniuntur ap. Gregorium Corinthium, In Hermogenis De methodo* 5 (*RhGr t.* 7.2 p. 1153.17–18, 1154.8, 15 Walz)

6–7 *Arist. Rhet.* 2.23 1398b27–9 = *Sappho, fr.* 201 *Lobel et Page; Greg. Cor. p.* 1153.18–20 Walz

8–10 *Arist. Rhet.* 1399a21–3; *Greg. Cor. p.* 1153.20–3 Walz

οὐ δὲ τὰς εὐτυχίας τὰς ἐκ τῶν θεῶν διδομένας ἀποδέχεσθαι·
πολλοῖς γὰρ

ὁ δαίμων οὐ κατ' εὐνοίαν φέρων
μεγάλα δίδωσιν εὐτυχήματ', ἀλλ' ἵνα
τὰς συμφορὰς λάβωσιν ἐπιφανεστέρας.

15

καὶ πάλιν Διοκλῆς κατηγορῶν τοῦ νόμου, ἐπεὶ ἐθορύβησαν αὐτῷ
τινες εἰπόντι, ὅτι οἱ νόμοι δέονται νόμου τοῦ διορθώσοντος,
"καὶ γὰρ οἱ ἰχθύες ἄλός" εἶπεν. ἔτι καὶ ταῦτα Θεόφραστος ἐξ
ἐπαγωγῆς ἐνθυμήματα κέκληκε· προθεῖς γὰρ νόημα σκληρὸν δοκοῦν τὸ
"πάντες τοὺς σοφοὺς τιμῶσι" καὶ εἰπὼν εἰς πίστιν τούτου τὸ
"Πάριοι γοῦν Ἀρχίλοχον καίπερ βλάσφημον ὄντα τετιμῆκασιν"
ἐπήγαγε "καὶ Χῖοι Ὀμηρον οὐκ ὄντα πολίτην καὶ Μιτυληναῖοι
Σαπφῶ καίπερ γυναῖκα οὖσαν καὶ Λακεδαιμόνιοι Χίλωνα τῶν γερόν-
των ἐποίησαν ἥκιστα φιλόλογοι ὄντες καὶ Ἰταλιῶται Πυθαγόραν
καὶ Λαμψακηνοὶ Ἀναξαγόραν ξένον ὄντα ἔθαψαν καὶ τιμῶσιν ἔτι
καὶ νῦν." * * * καὶ ὅτι Ἀθηναῖοι τοῖς Σόλωνος νόμοις χρησά-
μενοι εὐδαιμόνησαν καὶ Λακεδαιμόνιοι τοῖς Λυκούργου καὶ Θήβη-
σιν ἅμα οἱ προστάται φιλόσοφοι ἐγένοντο καὶ εὐδαιμόνησεν ἡ
πόλις· ταῦτα γοῦν καὶ τὰ τοιαῦτα μὴ προστεθέντα μὲν οὐ ζη-
τοῦνται, ἐὰν δὲ προστεθῶσι, κατασκευάζουσι τὸν προτεθέντα
νοῦν καὶ ποιοῦσιν ἰσχυρὸν καὶ σχεδὸν ἀναμφίβολον.

20

25

30

12-15 *Arist. Rhet.* 1399b22-4 = *TrGF* t. 2 p. 40, *adespota* 82, et cf.
Anonymi Comm. in Arist. Rhet. 2.23 (*CIAG* t. 21.2 p. 141.21-3)

16-18 *Arist. Rhet.* 1400a9-11, *quo loco verba Androcli* (*Or. Att. pars* 2 p.
153-4 *Sauppe*) *attribuuntur*

20-9 *Arist. Rhet.* 1398b10-19, *quo loco verba notulis citationis inclusa*
Alcidamanti (*Art. scr. B XXII* 14) *adscribuntur*; *vid. infra ad v.* 26

29-31 *Greg. Cor.* p. 1153.23-1154.1 *Walz*

16 *Διοκλῆς cod.* : Ἀνδροκλῆς *Arist.*

19 ἐνθυμήματα *scripsi* : ἐνθυμήματος *cod.* : ἐνθύμημα *Rabe*

προθεῖς Rabe : *προσθεῖς cod.*

24 καὶ Ἰταλιῶται Πυθαγόραν *haec verba reperiuntur etiam in Arist. Rhet.*
1398b15, *quo loco ea secluserit Kassel*

26 *post νῦν lac. signavi, secutus Vahlen* (*Rh. Mus.* 9 [1854] 557 et *Wiener*
SB 43 [1863] 503), *qui lac. in Arist. Rhet.* 1398b16 *statuit*

29 *προσθεθέντα Greg. Cor.* : *προσθέντα cod.*

29-30 *ζητοῦνται Greg. Cor.* : *ζητῶν cod.*

ENGLISH TRANSLATION

"Supplemental argumentation (*epenthymēsis*) is supplying an enthymeme, which when not added is not missed, but when added benefits the whole." Here he (Hermogenes) defines supplemental argumentation and says that it is supplying an enthymeme for thoughts already advanced, and when not added (the enthymeme) is not desired, but when added it helps the case greatly. For example, Sappho says that dying is bad, for the gods have judged it so; for they would die, if dying were something fine. And again: "You must not make public speeches, for making public speeches is a dangerous activity which excites envy. So if you say what is just, men will hate you; but if you say what is unjust, the gods will." And again: One must not accept good fortune given by the gods. For to many

the deity, not motivated by good will,
gives great good fortune; rather he intends
that their ruin be more conspicuous.

And again, Diocles was indicting the law. When certain people shouted at him for saying that the laws need a law to set them straight, he said, "For even fish need salt." Furthermore, Theophrastus has called them enthymemes based on induction. For having advanced the seemingly difficult idea: "Everybody honors the wise," and having said in support of this: "The Parians at least have honored Archilochus despite his evil-speaking," he adduced (the following): "And the Chians have honored Homer though not a citizen, and the Mityleneans Sappho despite her being a woman, and the Spartans made Chilon one of the Elders though they have very little interest in learning, and the Italian Greeks (honored?) Pythagoras, and the people of Lampsacus buried Anaxagoras though a foreigner and they honor him even now." * * * and that the Athenians enjoyed happiness using the laws of Solon and the Spartans (using) those of Lycurgus, and at Thebes the rulers became philosophers and at the same time the city enjoyed happiness. These (arguments) at least and similar ones, when not added, are not desired, but if they are added, they establish the thought which has been advanced, and they make it strong and almost noncontroversial.

* * *

As the apparatus indicates, some of John's text is also found in a commentary on the *De methodo* by Gregory of Corinth. This is hardly surprising, for as Rabe makes clear,³ John and Gregory used a common source. What is surprising and what interests us is that both John and Gregory reproduce almost verbatim material found in Aristotle's *Rhetoric* 2.23, yet neither names Aristotle. Apparently the compiler of the common source went through

Aristotle's discussion of *topoi* and picked out examples which he thought suitable for elucidating the *De methodo* on supplemental argumentation. Whether the compiler named Aristotle is uncertain, but my guess is that he did not.⁴

The first four examples (lines 6–18) are taken progressively from *Rhetoric* 2.23. The first concerning the negative value of death is used by Aristotle to illustrate the 11th *topos*: argument based upon a previous decision (*ek kriseōs*). The second which argues against public speaking is found under the 14th *topos*: a particular kind of argument from consequences (*ek tou akolouthountos*). The third which warns against accepting good fortune is taken from the 19th *topos*: attributing a possible motive (*to hou heneka*). The fourth concerning the indictment of law occurs under the 21st *topos*: argument based on what is supposed to happen and yet is incredible (*ek tōn dokountōn men gignesthai apistōn de*). The progression of examples is given an orderly ring by the repeated use of the conjunctive phrase *kai palin* (lines 8, 10, 16), and aside from the proper name Diocles (line 16) there are no textual problems.

With the fifth example things are different. The phrase *kai palin* is replaced by *eti kai* (line 18), and the orderly progression forward in *Rhetoric* 2.23 is broken by a jump back to the 10th *topos*: argument based on induction (*ex epagogēs*). In the first four examples the *topos* was not mentioned by name. Now the *topos* is named, and the naming is associated with Theophrastus. Moreover, if John's text is taken as transmitted in the manuscript, then not only is the label "enthymemes based on induction" referred to Theophrastus but so is the fifth example concerning honors shown to wise men. Yet this example is taken almost word for word from Aristotle's *Rhetoric*, where it is attributed to Alcidas (1398b10). Apparently something has gone wrong, but exactly what is not clear.

One possibility should be mentioned in order to be rejected. It is that John or rather the compiler of his source is drawing on a commentary by Theophrastus in which the latter quotes Aristotle extensively. The attractiveness of this possibility is obvious: we can explain at once why Theophrastus is named in the midst of excerpts from Aristotle's *Rhetoric*. But there are reasons to resist this attraction. First, if the excerpts from Aristotle's *Rhetoric* were made by Theophrastus and then taken over by a compiler from a Theophrastean commentary, John's text would not exhibit the same faults found in our manuscripts of the *Rhetoric*. In particular, we would expect to find a different and better text for 1389b9–18. Instead what we get is the same corrupt text (see the critical apparatus to lines 24 and 26)⁵ and this indicates that the excerpts were made at a time (long) after Theophrastus when the available manuscript(s) presented a text identical to that which has been transmitted to us.⁶

A further consideration is that the fifth example concerning wise men is

altered in a slight but significant way. In Aristotle's *Rhetoric* we first get the proposition which needs to be established: "everyone honors the wise" (1398b10), and then a string of six particular cases which together constitute an argument based on induction (1398b10–16). In John's text this string of particular cases is broken up, so that the first case—namely, that of Archilochus—is stated separately (line 21), after which five more cases are adduced (lines 22–6). This modification is not the work of Theophrastus but of a commentator on the *De methodo*. His aim is to make the Aristotelian example a better illustration of supplemental argumentation, but little is gained except appearances. For the case of Archilochus is not an argument on its own, and the subsequent five cases are not mere supplements which will not be missed if omitted (see lines 1–2 and 29–30). In fact none of the six cases is primary and all work together to establish the general proposition concerning wise men.

What we have then is a brief reference to Theophrastus followed by an unannounced excerpt from Aristotle's *Rhetoric*. This has a close parallel in John's immediately following note on general statements (*katholikoi logoi*, f. 428^v v. 9–34). Here he first tells us that general statements are maxims. Then he gives the definition of a maxim found in the *Rhetoric to Alexander* 12 (1430a40–b1), reports a Theophrastean definition and begins to draw upon Aristotle's *Rhetoric* 2.21 without signaling the shift from Theophrastus to Aristotle.⁷ Until John's commentary is thoroughly edited I shall resist any sweeping generalizations concerning his or his source's aims and integrity, but I am prepared to say that both in John's note on general statements and in his note on supplemental argumentation the Theophrastean material is minimal. In the former we have only Theophrastus' definition of the maxim and in the latter we have only the sentence "Furthermore, Theophrastus called them enthymemes based on induction."

What does this sentence tell us? I am not certain, for the reference of "them" (or "these," *tauta*) is not clear. The pronoun might be thought to pick up the preceding four examples (cf. the use of *tauta* in line 29), and if it does John is reporting that Theophrastus called these several arguments enthymemes based on induction.⁸ But that would be an unusual and possibly confusing use of the phrase "based on induction." For as we have seen, this phrase has a quite specific use: namely, to refer to arguments like the one which follows immediately in John's text. Perhaps we must leave the matter open, but in the absence of further evidence I am inclined to believe that Theophrastus is not doing anything new and that we are left with a hopelessly isolated sentence in regard to what precedes and in regard to what follows. The compiler has trimmed away so much context material that the reference of "them" (*tauta*) is lost and the transition to Aristotelian material occurs without any indication whatsoever. This is irritating, but it is, I think, what we have.

NOTES

1. "Aus Rhetoren-Handschriften," *Rheinisches Museum* 63 (1908) 127–51.
2. I am grateful to Dr. Michael Sollenberger for considerable help with cod. Vat. Gr. 2228.
3. Rabe (above, note 1) 130–32.
4. In John's very next note on general statements, we again find considerable Aristotelian material without any specific reference to Aristotle. See below and also my article "Theophrastus, Fragment 70d: Less, Not More," *Classical Philology* 81 (1986) 135–40.
5. Strictly speaking John's text is not corrupt (what he wrote is what we have). It is the Aristotelian text—the text John or his source faithfully (and mindlessly) transcribed—which is corrupt. That raises the question whether one should mark corruption in John's text or use the critical apparatus to note difficulties in the Aristotelian text. I have tried to be practical. Since the lacuna in line 26 is a jarring disturbance that admits no easy remedy, I have thought it best to mark the lacuna in John's text. The words *kai Italiōtai Pythagoran* in line 24 are somewhat different. Although they occur awkwardly and have been bracketed by Kassel in his edition of Aristotle's *Rhetoric*, they are not completely impossible. An unusually nimble reader might be able to leap backwards over the example of Chilon and pick up *tetimēkasīn* in line 21. Moreover, if one decides to mark corruption in line 24, it is not entirely clear whether the words should be bracketed (in other words, removed) or a dagger used to mark some disturbance (possibly the loss of several words including the much needed verb). In any event, the difficulties in lines 24 and 26, taken together, make it clear that we are dealing with an excerpt drawn from some Aristotelian manuscript that contained the same text as we have today.
6. When the corruption in question entered the manuscript tradition is uncertain. We can only say that the corruption is present in our earliest and best manuscript (cod. Par. Gr. 1741) which dates to the tenth century.
7. For this portion of John's text see my article cited above, note 4.
8. The pronoun *tauta* (neuter plural) need not presuppose some particular noun, but if one is wanted *epenthumēmata* seems a natural choice.

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